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ABSTRACT

Offered in response to a request for background information from the Congressional Subcommittee on Science, Research, and Technology, the document presents a report of the National Science Foundation's (NSF) support for social and psychological sciences research. Major objectives of the report are to review the origins of NSF support programs; assess issues of priorities, management, and use; and consider NSF support programs in the context of the total federal research support effort. The document is presented in six chapters. Chapter I offers a summary of the report. Chapter II discusses general trends which characterize NSF funding for psychology and social science programs and examines the need for a balanced perspective on support of quantitative versus nonquantitative studies. Chapter III describes the origin and evolution of NSF's psychological and social sciences support programs since 1960. Chapters IV and V assess NSF funded programs, including objectives, management, proposal review mechanisms, and relationship of NSF programs to those supported by other agencies. Chapter V offers final observations. These include: (1) many NSF funding problems are typical of any federally supported scientific research program; (2) policymakers are increasingly calling upon social scientists for information; (3) creation of a separate National Social Science Foundation would simplify funding, management, and communication problems. (Author/DB)

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THE PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH SUPPORT PROGRAMS OF THE NATIONAL SCIENCE FOUNDATION: A BACKGROUND REPORT

PREPARED FOR THE

SUBCOMMITTEE ON
SCIENCE, RESEARCH AND TECHNOLOGY

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
NINETY-FIFTH CONGRESS
FIRST SESSION

BY THE

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Serial I

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LETTER OF TRANSMITTAL

House of Representatives,
Committee on Science and Technology,
Washington, D.C., April 1, 1977.

Hon. Olin E. Teague,
Chairman, Committee on Science and Technology, House of Representatives, Washington, D.C.

Dear Mr. Chairman: In October 1975, as part of the subcommittee's oversight of the National Science Foundation, former Subcommittee Chairman James W. Symington asked the Congressional Research Service to prepare a background report on social and behavioral research at the Foundation.

An executive summary of the report was printed in the record of the hearings on the Foundation's fiscal year 1977 authorization request.

I am submitting, herewith, the final document, which has been prepared by Genevieve Knezo of the Science Policy Research Division, together with certain comments of the Foundation. The subject matter and observations included do not necessarily reflect the views of the subcommittee or any of its members.

I commend the report to your attention and to all members of the committee.

Sincerely,

Ray Thornton,
*Chairman, Subcommittee on Science,
Research and Technology.*

LETTER OF SUBMITTAL

THE LIBRARY OF CONGRESS,
CONGRESSIONAL RESEARCH SERVICE,
Washington, D.C., August 20, 1976.

Hon. JAMES W. SYMINGTON,
Chairman, Subcommittee on Science, Research, and Technology, House of Representatives, Washington, D.C.

DEAR MR. SYMINGTON: I am pleased to transmit this report in response to your request for a background document, for oversight purposes, on the National Science Foundation's social and psychological sciences research support programs. The report reviews the origins of the programs, assesses issues of priorities, management, and use, and attempts to place NSF support programs in the context of the total Federal effort in these areas. As your staff requested, we also described some significant recent achievements of the programs supported by the Directorate of Biological, Behavioral and Social Sciences, and the Research Applications Directorate.

Ms. Genevieve J. Knezo, of the Science Policy Research Division, prepared the report. Among other Congressional Research Service staff who provided assistance and critiques were: Dr. Franklin P. Huddle, Senior Specialist in Science and Technology; and Dr. Langdon T. Crane and Mrs. Dorothy M. Bates of the Science Policy Research Division.

We have been pleased to undertake this assignment and hope that the study is useful. Please let us know if we can provide additional assistance.

Sincerely yours,

NORMAN BECKMAN,
Acting Director, Congressional Research Service.

THE PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH SUPPORT PROGRAMS OF THE NATIONAL SCIENCE FOUNDATION: A BACKGROUND REPORT

August 1976

ABSTRACT

The Congressional Research Service prepared this report at the request of Hon. James W. Symington, chairman of the Subcommittee on Science, Research and Technology, House Committee on Science and Technology, to aid in oversight of the National Science Foundation's support programs for psychological and social sciences research.

The executive summary is followed by the full report which contains five chapters. The study begins with a discussion of some general issues which characterize Federal psychological and social sciences research support programs. Also described are major studies now underway which are intended to clarify basic issues about priorities, organization, and use of Federal psychological and social sciences research support programs.

The origin and evolution of NSF's psychological and social sciences support programs are treated in chapter II. Chapters III and IV describe and assess the achievements, strengths, and apparent shortcomings of programs of the Directorate of Biological, Behavioral and Social Sciences for basic and applied research support and the Directorate of Research Applications (the Research Applied to National Needs (RANN) program), which supports problem-oriented social research. Among the issues covered are numbers of awards, general funding trends, the objectives of research support programs, questions of management, priorities, proposal review mechanisms, and the relationship of these programs to those supported by other Federal agencies.

Reference is made in chapters III, IV and V to congressional reactions to the evolution of these programs. The final sections of these chapters contain summaries of the major issues which would seem to require additional attention.

The appendix contains illustrations of significant recent achievements of NSF's psychological and social sciences research support programs, the findings of the National Research Council's Committee on the Social Sciences in the National Science Foundation, and descriptions of the disciplines encompassed by the fields of psychological and social sciences.

ACKNOWLEDGMENTS

Most of the information used to prepare this report comes from public documents. However, we should like to acknowledge the gracious assistance of those persons who participated in interviews or provided a number of relevant unpublished documents to supplement the public record. Among staff of the National Science Foundation who merit appreciation are: Dr. Ernest Powers as a member of the Science and Technology Policy Office; Dr. Howard Hines, former Director of the Division of Social Sciences, and other members of the Division; Dr. James Cowhig, Acting Director of the Division of Advanced Productivity Research and Technology, and his staff; and Ms. Patricia McWethy, as Special Assistant to Dr. Richard Atkinson, as the Deputy Director.

Dr. Herbert Simon, chairman, and Dr. Sara Kiesler, executive secretary, of the National Academy of Sciences' Committee on the Social Sciences in the National Science Foundation also provided valuable information and analysis which contributed to the preparation of this report.

Appreciation goes also to several Congressional Research Service staff members: for invaluable guidance and review, Mrs. Dorothy Bates; and for typing and editorial assistance, Sandra Kay Al-Nazer, Christine Anderson, Joanne C. Chapman, Jeanette E. Porter, June H. Sherren, and Jennifer T. Woodward.

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SUMMARY

A. PREFACE

This overview summarizes a report entitled "The Psychological and Social Sciences Support Programs of the National Science Foundation: A Background Report." The Science Policy Research Division of the Congressional Research Service prepared the draft report in response to a request of the Honorable James W. Symington, chairman of the Subcommittee on Science, Research, and Technology, House Committee on Science and Technology, for a ". . . background paper . . . on social and behavior[al] research at the Foundation, placing the Foundation's work in the context of the total national effort in that area."

B. INTRODUCTION

The scientific disciplines encompassed by the term "psychological and social sciences research" include: sociology, psychology, political science, economics, geography, anthropology, and linguistics. While of demonstrated merit, federally supported psychological and social sciences research support programs, including those sponsored by the National Science Foundation (NSF) are beset with many of the problems which typically accompany any federally supported scientific research program. These include issues of management, priorities, effectiveness, utility of output, and communication between scientific researchers and Federal research administrators.

Chapter I of the report (summarized in section C, below) outlines some of the major issues pervading current discussions about the Federal support and use of psychological and social sciences research. Chapter II (see section D) describes the origin and evolution of NSF responsibilities for the psychological and social sciences and the legacy of policymakers' initial skepticisms about including these disciplines as legitimate topics for support by the Foundation. Chapters III (section E) and IV (section F) discuss, respectively, the accomplishments and shortcomings of the basic and applied psychological and social sciences research support programs of the NSF, and those of its problem-oriented psychological and social sciences research support programs under the Research Applied to National Needs program.

Each of these chapters is summarized below.

C. SOME PERVASIVE DILEMMAS IN THE SUPPORT AND USE OF PSYCHOLOGICAL AND SOCIAL SCIENCES

A number of fundamental recurring issues pervade current discussions about Federal policies for the support and use of psychological and social sciences research. These issues also seem to pervade the environment of the National Science Foundation's psychological and social sciences research support programs.

Both politicians and scholars seem to agree that major social problems and problems at the interface of science and technology cannot be solved without better understanding and accumulation of knowledge about fundamental dimensions of human behavior, social interaction, and institution-building.

Despite these expectations and the many evidences of invaluable research findings, the topic of Federal funding for the psychological and social sciences—a primary source of financial support for psychological and social sciences research—seems to be almost as controversial today as it was in 1950, when Congress passed the National Science Foundation enabling legislation, and decided that the Foundation should not be given an explicit mandate to support research in psychological and social sciences. At first, the Foundation was permitted to fund these disciplines to a limited extent under its authority to support "other sciences." In 1968, after the merits of such research had been demonstrated, the Congress gave the NSF explicit authority to fund research in the "social and other sciences." However, despite considerable evidence of the merits and utility of federally funded psychological and social sciences research, some policymakers continue to criticize Federal involvement in this area. Critics debate whether the social sciences really are scientific, whether topics of research justify expenditure of taxpayers' money and whether social research does anything more than merely reaffirm commonsense notions about the causes and effects of human behavior.

Funding patterns

Several specific issues characterize the controversies surrounding Federal programs for these sciences. Many policymakers appear to hold considerable expectations about the problem-solving utility of psychological and social research. However, Federal funding for basic and applied research in psychology and the social sciences constitutes but a fraction of the total Federal research budget. For the fiscal year 1976, an estimated $493.2 million or about 6 percent of the Federal research budget was allocated for psychological and social research.

Furthermore, Federal expenditure patterns and priorities for these sciences do not seem to recognize the need to accumulate an adequate storehouse of basic research findings—findings which form the necessary structure for subsequent applied and policy-oriented psychological and social research and development.[1] Typically, Federal expenditures for applied and policy research in the social and psychological sciences are about three times the expenditures for basic research in these sciences.

NSF support for psychology and social sciences goes primarily basic research in these sciences. However, the Foundation is moving toward the support of more applied research in these areas. For instance in the fiscal year 1970, about 20 percent of NSF support for these sciences was for applied research. It is estimated that about 35 percent of research support for these sciences for the fiscal year 1976 will go to applied research. In addition NSF funding for both basic and applied psychological and social research has also consistently declined since 1971 as a percentage of total NSF research funding. The onset of this pattern of relative decline seems associated with the inception of the Research Applied to National Needs (RANN) program. For example, in the fiscal year 1970, before the RANN program began, NSF support for basic and applied research in these sciences constituted 10 percent of the Foundation's research budget. In the fiscal year 1976 it is estimated that NSF's basic and applied psychological and social sciences research support programs decreased to constitute about 5 percent of the Foundation's research budget. The Congress seems to have expressed its approval of these trends, as evidenced by actions taken on the Foundation's fiscal year 1976 budget. The House and Senate authorizing committees for NSF placed a floor (obligation minima) of $23 million on applied problem-oriented social research and policy research funded by RANN. At the same time, the Senate Appropriations Committee instructed the Foundation to cut back on its scientific research support program and to make cuts first in non-RANN basic and applied social research programs.[2] (However, this action led to a proportionality reduction to $19.5 billion for RANN applied social research.)

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[1] This theme is more fully developed: "Government Science Policy:: Some Current Issues on Federal Support and Use of the Behavioral and Social Sciences." Statement prepared in accordance with the request of the Science and Astronautics Committee. By Genevieve J. Knezo, analyst, science and technology, Science Policy Research Division, Congressional Research Service, Library of Congress Nov. 18, 1974. In U.S. Congress. House. Committee on Science and Astronautics. Federal Policy, Plans, and Organization for Science and Technology, part II. Hearings, 93d Cong., 2d sess. June and July 1974. Washington, U.S. Government Printing Office, 1974, pp. 517–568.

The establishment of priorities for research support

Another set of issues defining current controversies for psychological and social sciences research concerns the extent to which social scientists and policymakers can establish priorities for the support of basic and applied research which would hasten the development of lagging areas of understanding and promote the accumulation of knowledge and research findings to help solve problems. Numerous studies of needs and research priorities for these sciences have been conducted in the past. However, they do not seem always to have provided useful guidance. Several studies of priorities are now underway, including comprehensive assessments by the General Accounting Office, and by the Committee on the Study of Social Research and Development, at the National Academy of Sciences. The latter study was requested by the Science and Technology Policy Office (now redesignated Policy Research and Analysis Division of the Scientific, Technical, and International Affairs Directorate) of the National Science Foundation. Among its preliminary findings are that social science research and development expenditures totaled about $1.2 billion for the fiscal year 1975. The study raised numerous questions about the purposes, quality, and the use of this research and development.

In this connection, Senator William V. Roth, Jr. introduced a bill in December 1975 (S. 2766) to provide the Congress with better information for oversight of social research and development programs. Among its provisions for better accountability is one that would have required the Office of Management and Budget to approve all Federal grants and contracts for social research and development which would total more than $25,000.

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[2] The Congress has not yet completed action on the fiscal year 1977 NSF budget request. However the Foundation asked for a 23-percent increase in the behavioral and neural sciences program subactivity (can generally be considered as basic and applied psychology). The largest increases under this category are for: neurobiology, psychobiology, and sensory physiology and perception. The fiscal year 1977 budget request for the social sciences subactivity is 18 percent larger than the fiscal year 1976 request. The largest increase is for the line item: "economics, human geography, and regional sciences."

Data made available after this report was written indicate that NSF support for basic and applied psychology and social sciences research (exclusive of RANN) constituted about 7 percent of the total NSF budget for the fiscal years 1977, estimated and 1978, estimated.

The National Science Foundation has initiated activities to examine its psychological and social sciences support programs and to improve the management and conduct of these support programs. The Foundation funded a committee of the National Research Council to conduct a comprehensive assessment of the management, priorities, and output of NSF's psychological and social sciences research support programs. An interim report was released for comment in February 1976; the final report was published in August 1976.[3] (The appendix of this committee print has a summary of the report's conclusions.)

The difficulties of preprograming priorities for research

At least two other recent studies have been completed on facets of these issues. One addressed the psychological and social science research programs of the National Institute of Mental Health,[4] and the other general Federal social research programs, including those of the National Science Foundation.[5] Both of these studies indicated that it is impossible to preprogram priorities for basic research since neither scientists nor their Federal sponsors can predict the outcome or eventual utility of basic research findings. These groups also agreed that there is sufficient evidence to demonstrate that Federal basic research support programs have generated a considerable body of useful findings and that more emphasis should be given to supporting basic psychological and social sciences research. These findings differ considerably from those of a 1975 internal NSF management report on social sciences which concluded that the Division of Social Sciences should adopt social utility criteria for the support of basic and applied research similar to the utility criteria used in the RANN program. The Foundation did not release this report because there was no consensus on its findings.

The appropriate "mix" between "quantitative and nonquantitative" studies

Discussions of Federal support for the psychological and social sciences, especially of NSF support programs, include yet another issue, that of the appropriate mix between "scientifically rigorous, quantitative, and methodologically sound" basic research studies, and other basic research studies which use nonquantitative approaches, such as case studies and institutional studies. As noted previously, original congressional reservations about the Foundation's support of potentially controversial and politically sensitive research led to initial congressional rejection of the social sciences as an explicit area of NSF support when the Foundation was first established in 1950. These criticisms seem to have been mitigated by NSF's early decision to emphasize the funding of quantitative and methodologically rigorous studies. This emphasis coincided with the "behavioral revolution" of the 1960s, when social scientists themselves expressed a preference for doing quantitative research. However, some social scientists are now complaining that the Foundation has overemphasized methodologically rigorous, quantitative studies, which have not enhanced the state-of-the-art of these disciplines as had been expected. Some also note that the Foundation's support programs impose the criteria of the physical and natural sciences on subject matter which does not lend itself to quantification. In summary, more attention may have to be given to determining the appropriate mix of quantitative and nonquantitative studies, since many social scientists are calling for more basic qualitative research studies—of norms, values, and institutional factors—of the basic qualitative issues which delimit public policy choices for social programs.

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[3] Social and Behavioral Science Programs in the National Science Foundation: Final Report. By Committee on the Social Sciences in the National Science Foundation, Assembly of Behavioral and Social Sciences, National Research Council. Washington, D.C., National Academy of Sciences, 1976. 103 p.

[4] Research in the Service of Mental Health: Report of the Research Task Force of the National Institute of Mental Health. Prepared by Task Force Staff and Coordinating Committee with Herbert Yahraes. Ed. by Julius Segal. Washington, U.S. Government Printing Office, 1975. (DHEW Publication No. (ADM) 75-236.)

[5] National Science Foundation. Advisory Committee on Research. Report of Task Group No. 10. The Social Sciences as a Research Area in the National Interest. Nov. 4, 1975. Typescript.

The use of social research in policymaking

A final issue pervading these discussions deals with the need to assess further obstacles to the use of social research in policymaking. Many recent studies of this issue indicate that politics and emotion constitute the major obstacles to the use of social information. Some policymakers will not use psychological and social science research findings if these are counterintuitive to their notions of the causes and effects of human behavior and social change.

D. THE ORIGIN AND EVOLUTION OF NSF RESPONSIBILITIES FOR PSYCHOLOGICAL AND SOCIAL SCIENCES

Congressional criticisms of the potentially scientifically nonrigorous and politically sensitive nature of the social sciences diminished when NSF began to sponsor studies which were distinctly quantitative in orientation.

At first the Foundation supported biologically oriented studies in psychology and anthropology from the Divisions of Biological and Medical Sciences and Mathematical, Physical and Engineering Sciences. Shortly thereafter "sociophysical sciences" were added. NSF gradually increased support for other social sciences disciplines: sociology, geography, linguistics, and social psychology, but almost exclusively for quantitative, scientifically rigorous studies. In 1960 the Foundation created a Division of Social Sciences in the Research Directorate, and thereafter added support for political science, history and philosophy of science, science policy, economics, and other studies at the interface of science and society.

Expansion of the Foundation's mandate in 1968 to include social sciences and applied research

In 1968, when a bill to create a National Foundation for the Social Sciences was under consideration in the Senate, the Congress enacted Public Law 90-407, a law which, in part, amended the Foundation's mandate by giving explicit recognition to the Foundation's role for supporting social sciences. This action can be interpreted as reflecting congressional approval of the directions taken in the Foundation's social research programs (and to the Foundation's creation of the Division of Social Sciences in 1960).

Public Law 90–407 also gave the Foundation authority to support applied research. This action has had major implications for NSF social research support programs. Support for problem-oriented applied social research programs in RANN has consistently increased. It is estimated that in the fiscal year 1976, total funds allocated for RANN social problem-oriented research programs exceeded by a factor of about seven funds allocated to other applied social research programs.

A capsule picture of the funding history for these sciences is given next:

NSF FUNDING FOR BASIC, APPLIED AND SOCIAL PROBLEM-ORIENTED RESEARCH

[In millions of dollars]

Fiscal year	Basic			Applied			NEC (Rann)[6]		
	1960	1969	1976 estimate	1960	1969	1976 estimate	1960	1969	1976 estimate
Psychology	2.6	6.3	6.8	0	0	1.2	0	0	0
Social sciences	1.8	15.3	27.6	0	.7	2.6	0	3.7	23 (19.5)

[6] Not elsewhere classified, generally used as the reporting category for RANN problem oriented social research.

[7] The congressionally mandated minimum of $23,000,000, cut to $19,500,000 after application of the proportionality reduction of the fiscal year 1976 appropriation act.

Current organizational arrangements for psychological and social sciences research support in the RANN program and in the Directorate of Biological, Behavioral and Social Sciences

There have been recent reorganizations in both the RANN program and in the Division of Social Sciences at the NSF. In brief, during 1974, the problem-oriented social research programs in RANN's section on Social Systems and Human Resources (SSHR) were transferred to a new program category called productivity. Some of the original SSHR support programs were terminated, or given less emphasis, for instance, those in social data and evaluation. More emphasis seems to have been placed on the interdisciplinary (problem-oriented) research relating to social services delivery questions.

In 1975, the former Division of Social Sciences, one separate division in the research directorate which included all disciplines, was placed under the jurisdiction of the newly created Directorate for Biological, Behavioral and Social Sciences. Some of the Division's functions for social research, that is for anthropology, linguistics, and social psychology, were transferred from the Division of Social Sciences to the newly created Division for Behavioral and Neural Sciences. In February 1975, Dr. Richard Atkinson, a psychologist, was named Deputy Director of the National Science Foundation, and then in July 1975, acting head of the Directorate of Biological, Behavioral, and Social Sciences. Subsequently Dr. Eloise Clark, a biologist, was named head of the Directorate. Some reports indicate that the effect of the reorganization has been to give the psychological and social sciences more status and visibility within the NSF. However, this conclusion is not yet clear.

E. NATIONAL SCIENCE FOUNDATION BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL SCIENCES SCIENTIFIC RESEARCH PROJECT SUPPORT PROGRAMS

Several issues may be raised about the Foundation's basic and applied psychological and social sciences scientific research project support programs. These include: the importance of the program for academic institutions, funding problems, determining and articulating priorities, the distribution between continuing support projects and new projects, the possible concentration of awards, and the adequacy of advisory panels.

The importance of the program for academic institutions

Funding data indicate that while the National Science Foundation's support program constitutes only about 10 percent of all Federal expenditures for these sciences, this support program seems to be critical and essential to Federal policies and programs for the conduct of basic and applied social and psychological research in academic institutions. For example, in the fiscal year 1974, 86 percent of NSF expenditures for basic and applied psychological and social sciences research were performed in academic institutions. More important perhaps, during the fiscal year 1974, NSF expenditures for basic and applied psychological and social sciences constituted 45 percent of all Federal agency basic and applied research expenditures for these sciences in American universities and colleges. The importance of the Foundation's role is evidenced especially in the disciplines of anthropology, history, linguistics and political science for which it provided, in 1974, more than half of all Federal agency funds for academic basic and applied research and 70 percent or more of all Federal basic research funds for academic research. NSF support also constituted about two-thirds of all Federal funds awarded to academic institutions for interdisciplinary basic psychology and social research projects.

Issues in funding for psychological and social sciences research

The Foundation's role as a supporter of psychological and social sciences research seems to be undermined, however, by a considerably diminishing supply of research funds to support these fields. Psychology and social sciences have consistently been the least successful of all fields of science supported in NSF, in terms of numbers of awards made in relation to the number of proposals submitted, and the amount of grant funds awarded, in relation to the dollar amounts requested. Success rates for these fields of science average about 40 percentage points below the most successful fields. NSF's role as a supporter of basic and nonproblem-oriented applied research has also diminished considerably since inception of the RANN program. When assessed in terms of dollar support, NSF awards for basic and applied research in these areas have increased about one-third since 1966, in terms of current dollars. In terms of constant dollars, these sums decreased by about 15 percent. These patterns are significant in themselves but especially important when compared with the doubling in the number of academic psychological and social scientists that has occurred since 1965.

The complexity of determining and articulating program priorities

Questions have been raised about whether the Foundation's support programs for the psychological and social sciences might be better justified and understood if the agency better articulated its program accomplishments and program objectives. There seems to be considerable evidence to indicate that the Foundation has established priorities for its programs and that it prepares internal documents which are used to justify its support priorities. General program priorities, which are expressed in public documents, indicate that NSF is interested in funding studies which advance the methodology of the social sciences and which generate cumulative advances in the disciplines supported. However, insufficient effort seems to be made in NSF's public documents, especially annual reports and budget submissions to explain these priorities and past and present programmatic efforts in terms of these priorities.

Special attention seems to be needed to identify especially the rationale and funding patterns for continuing awards, student training, support for equipment, development of data bases and institutional support programs. There are indications, however, that divisional reporting practices would have to be modified in order to meet these requirements. Frequently, many research performers do not provide the Foundation with reports on publications which resulted from NSF project support. In addition, the Division of Social Sciences prefers to wait, according to some reports, until research has been reported in the technical literature before describing research accomplishments to the public. This practice coincides with the requirements of scientific integrity, but may hamper expedient public accountability.

Distribution of resources between continuing and new project support

The issue of continuing support projects in the social sciences seems to require clarification especially since the Foundation does not seem to make sufficient effort to indicate publicly the identity or grant number of continuing awards or the cumulative amount of continuing awards. Some grant numbers have received amendments which cumulatively total about $1 million for funding over a 5-year period. Many of these amended regular grants and amended continuing grants can be considered as NSF psychological and social sciences research priorities. The data for the fiscal year 1975 indicate that in a few social science disciplines more than 50 percent of the awards made are for amendments of regular or continuing grants, not for new project support. Continuing grants are not reviewed according to the external peer review process every time they are amended; therefore it seems that questions can be raised regarding the extent of annual peer and panel review of funding for some social sciences disciplines. Reporting procedures for amendments also seem to merit attention so that continuing grants may be better identified to assist potential proposal submitters and others in identifying and tracing priority areas of support.

The possible concentration of awards

Computations of data describing the Foundation's psychological and social sciences support programs tend to indicate that awards seem to be somewhat disproportionately concentrated in a few schools. For example, in the fiscal year 1974, five schools were among the top 10 recipients of awards for psychology and social sciences, based on the amount of funds awarded and proposals funded. These schools constituted 1.4 percent of the total number of schools submitting proposals and they received 15 percent of the funds awarded. In psychology, the top 15 schools, by award amount, received about 42 percent of the funds awarded for this discipline. The top 15 schools in psychology by success ratio (proposals funded in relation to proposals submitted) had submitted 19 percent of the proposals received and received 33 percent of the grants awarded. The top 15 schools in social sciences, by amount of award received 38 percent of the funds awarded for social sciences. The top 15 schools in social science, by success ratio, had submitted 16 percent of the proposals received by NSF for social sciences; the schools received 27 percent of the proposal awards made. There is some information to indicate that top recipients may not be the best research performers. Questions are raised therefore regarding the need to evaluate further whether NSF's top recipients in social sciences are the best performers in terms of research output.

The adequacy of advisory panels

Several other internal management issues are discussed. Among the more important, it is noted that the Foundation does not appear to have constituted advisory panels for some of the discipline areas supported, or programs areas which seem to be emphasized. Panels did not exist in the fiscal year 1975, for instance, for geography, social indicators, linguistics, law and social science, science policy, special projects, and programs supporting mathematics and social sciences, development of longitudinal data bases, and research in modelling. The Foundation undoubtedly uses *ad hoc* reviews and consultations with outside professionals to seek guidance in establishing new program emphases or when funding cumulatively large continuing awards for specific topics, such as social indicators, management facilities, and development of data bases. However, the question can be raised about whether *ad hoc* reviews are sufficient for large interdisciplinary program areas of continuing duration.

Other issues

The following are among the other relevant management issues. First, is the issue of determining an appropriate mix between quantitatively oriented basic research studies and other types of basic research studies which do not use quantitative methods, such as case studies and institutional studies. Second, questions are raised whether NSF-supported projects may overlap or duplicate those of other agencies. Areas for possible inquiry include support programs in psychology, economics, sociology, and interdisciplinary projects.

Generally, it is recognized that the nature of scientific research probably prevents NSF from rigidly preprogramming basic research priorities. Nevertheless, the Foundation does seem to have made attempts to formulate priorities. The issue is whether NSF has a responsibility to articulate better its priorities to Members of Congress and the public, and to assist researchers, staff or other agencies and its own personnel in identifying lagging or promising areas of research.

F. PROBLEM-ORIENTED APPLIED SOCIAL RESEARCH IN THE PROGRAM OF RESEARCH APPLIED TO NATIONAL NEEDS

The Research Applied to National Needs Program (RANN) was initiated in the fiscal year 1971 to implement the provisions of Public

Law 90-407 which, in part gave the Foundation added authority to conduct "applied research relevant to national problems involving the public interest." The RANN program, as created by NSF, supports problem-oriented interdisciplinary research which meets specific user needs, cross-cuts the responsibilities of other agencies, generates comparative findings, or is done on behalf of other agencies to avoid bias which might result from an agency sponsoring policy research related to its mission.

RANN has supported applied social science research since its inception. This program has evidenced a consistent increase in support, from about $7 million in the fiscal year 1971 to a congressionally mandated minimum of at least $23 million for fiscal year 1976. (Application of the "proportionality" provisions of the NSF Fiscal Year 1976 Appropriations Act (P.L. 94-116) reduced the minimum requirement to $19.5 million.) The Congress directed that NSF give special attention in its fiscal year 1976 social sciences program to applied social research and policy research to assist in solving urban, municipal, welfare, and general growth and productivity problems. (The House Authorization Committee gave the same spending floor of $23 million and emphasis to the fiscal year 1978 RANN social research program.)

Several shortcomings in the management of the RANN program have been identified. These criticisms have come from both Members of Congress and from the General Accounting Office in a report, entitled "Opportunities for Improved Management of the Research Applied to National Needs Program."

Project duplication; research not related to "national needs"; and lack of generalization of research results

Congressional criticisms of the RANN program include the following: Some projects duplicate or overlap the responsibilities of other agencies; some research is unimportant when compared to "national needs"; and the results of some studies cannot be generalized, for instance, from one community to another.

Difficulties of determining priorities

The GAO's study identified several management problems which may contribute to these shortcomings. The study indicated that most of the priorities for specific social science studies are determined by NSF officials or by the trend of unsolicated proposals. GAO recommended that management would be improved, potential duplication would be avoided, and utilization would be enhanced if RANN program management attempted systematically to obtain a wider range of opinions about priorities for research. Specifically, the GAO noted that while NSF has established an interagency coordinating committee for RANN, as well as a subsidiary committee for social sciences, the committees have not played significant roles and have not met as frequently as necessary. The GAO also suggested that the determination of priorities for research would be improved if RANN management made more effort to solicit the view of potential users in problem identification and program formulation. One of the RANN's social science research projects—on revenue sharing—is used to illustrate these issues. It is also noted that RANN has not constituted disciplinary advisory groups for most social sciences project and that it might be useful to consider convening such groups to provide RANN with additional advice about reputable researchers and important research trends. NSF has made some of the recommended changes, but has questioned whether it would be cost-effective to widen the priority-determination mechanisms as recommended.

Proposal review procedures

The General Accounting Office also suggested that proposal review procedures seem to warrant improvement. The data and analysis provided by GAO indicate that program managers, who select reviewers, should be more objective in selection and that they should include a wider spectrum of individuals, especially more potential users in proposal review. GAO's work also suggests that researchers should be given more information about why awards might have been declined.

Problems in utilization planning and activity

Both GAO and congressional critics have also faulted RANN's utilization (that is, deliberate application) activities. NSF maintains that studies which might seem to duplicate the activities of other agencies are supported for a variety of reasons, including the needs: (1) to compile a quantitative basis of policy information for decisionmaking, (2) to support interdisciplinary research which other agencies may not be capable of managing, (3) to train other agency personnel in problem research management, and (4) to conduct impartial studies whose outcome might be biased if the study were to be conducted by a mission agency directly responsible for administering a program.

GAO's study of RANN utilization demonstrates several inadequacies, which do not seem to have improved even though RANN has improved its utilization plans. Based upon its research, including assessments of RANN social research programs, GAO recommended that RANN make systematic attempts to identify potential users and barriers to utilization when a research program is being formulated. The GAO also recommended that RANN conduct better evaluations of project results. NSF disagreed somewhat with these recommendations, noting that it might not always be cost-effective to identify all users and barriers to utilization in the program planning stage, since many users and barriers to utilization can be identified only as the research progresses.

The General Accounting Office also found deficiencies in RANN's utilization library. Only two-thirds of the reports prepared with RANN funding had been transmitted to the agency library, therefore curtailing dissemination.

Other Issues in RANN Problem-Oriented Social Research

Tabulations of preliminary data supplied by NSF on fiscal year 1975 awards indicate that social sciences support constituted about 18 percent of the RANN budget; the Productivity section managed about half; and about 60 percent of all social research awards went to university performers. The largest share of RANN social sciences funding was for economics research (about 40 percent of the total); and for other fields of social sciences, in decreasing order of amount of funding; other sciences, NEC;[8] social sciences, NEC; law; science policy; psychology-social aspects; political science; anthropology; computer sciences; and sociology.

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[8] NEC stands for "not elsewhere classified" or not falling within one of the discipline reporting categories. This reporting category for applied social sciences includes most of the interdisciplinary social sciences research RANN supports.

RANN seems to have sufficient social science staff capability to manage these awards, but it may be necessary to follow RANN management in the future to determine if social science staff capability will be augmented to implement the congressional request that RANN increase the amount of applied social research and policy research.

The inception of RANN applied social research programs coincided with recommendations from notable social science advisory groups that NSF support more problem-oriented social research. However, no NSF program including RANN, supports the creation of problem-oriented social research institutes recommended in these reports. RANN staff have indicated that university performers are not the best performers of policy research because university and discipline reward systems discourage the conduct of applied social research and policy research. In view of the apparent need to enhance the capability of university researchers to do problem-oriented policy research, it may be useful to obtain information about whether RANN is making efforts to improve academic capability to do policy research.

There is no evidence to indicate that NSF has established mechanisms to support systematic communication between program managers in RANN and in the Directorate of Biological, Behavioral, and Social Sciences. Further examination of this topic may be useful since RANN says it funds basic research, and because problem-oriented and policy research rest on previous accumulations of basic and applied social and psychological sciences knowledge.

The inadequacy of NSF mechanisms for reporting funds obligated for interdisciplinary applied social research is another problem. The general reporting category "social sciences NEC" is used to report about 29 percent of all Federal applied social research funds and 86 percent of NSF applied social research funds. Additional consideration might be given to determining whether this reporting system should be improved, so that interdisciplinary projects can be identified better in an effort to enhance oversight of similar programs, and to evaluate possible duplication among Federal agencies which support policy-oriented applied social research.

G. FINAL OBSERVATIONS

Discussions about creating a National Social Science Foundation—an alternative Federal agency which might govern and fund basic, applied and problem-oriented psychological and social research—have reemerged in congressional deliberations. Adequate assessment of the current NSF role and of any possible future alternatives to it, seems to require continued analysis of the scope, objectives and accomplishments of the NSF programs and also of other Federal agency support programs for these sciences.

I. INTRODUCTION: SOME PERVASIVE ISSUES IN THE FEDERAL SUPPORT AND USE OF THE PSYCHOLOGICAL AND SOCIAL SCIENCES

For the last several decades, the Federal Government has maintained substantial support programs for psychological and social sciences research. Despite the legitimacy conferred by this heritage, it is likely that these scientific disciplines are the most controversial and least understood of all federally supported fields of scientific research. Numerous factors both extrinsic and intrinsic to these sciences undoubtedly contribute to this situation.[9]

Two external factors seem to be most important. First, the subject matter of the psychological and social sciences, far from being esoteric to the layman, involves topics upon which almost everyone has an opinion and a supposed expertise. The strength of such common-sense perceptions probably shortchanges the credibility and acceptance of the findings of these sciences despite their complex research achievements. Second, the largest proportion of the Federal budget involves outlays for civilian benefit and social services programs whose content presumably is based on knowledge generated by psychological and social sciences research. Failures in social programs funded with these outlays frequently are attributed to faulty psychological and social science knowledge, but not to a more common reason—barriers of politics and implementation.

Other factors internal to the sciences themselves and to Federal programs for their support add to the current climate of controversy. Some of these topics, which constitute the major foci of current discussions about Federal support for the psychological and social sciences, will be discussed in this chapter. Among the topics included are: the emphasis on funding applied research; the need to assess the state-of-the-art of the disciplines and to identify priorities for support; the difficulties of preprogramming priorities for basic and applied as differentiated from problem-oriented research; the need to strike a balance between the support of mathematical and nonmathematical basic studies; and current advisory committee and congressional activities designed to improve the formulation of policies for psychological and social research in NSF and in other agencies.

Recently numerous and prestigious groups of statesmen and scholars have identified as major obstacles to world peace and balanced growth social problems or problems at the interface of science and technology on the one hand, and society on the other.[10] Usually these groups acknowledge that such problems cannot be solved without more understanding of the fundamental aspects of human psychological and social behavior. In a recent *Science* article, Dr. H. Guyford Stever, former Director of the National Science Foundation, described one study by the National Science Board and its recommendation for more research in the "softer social sciences:"

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[9] For extended treatments of these issues see: Horowitz, Irving Louis and James Everett Katz. Social Science and Public Policy in the United States. New York, Praeger Publishers. 1975. 188 p. and Lyons, Gene M. The Uneasy Partnership: Social Science and the Federal Government in the Twentieth Century. New York, Russell Sage Foundation, 1969. 394 p.

> Of all the problem areas that are setting the pattern for scientific research in the years ahead, perhaps the most difficult may be that which the National Science Board has categorized in its 1975 report under the heading of the "Challenges of Society." As the report stated, "The challenges in this category are almost limitless," and it cited a few—including international strife, discrimination, crime and delinquency, and the spectrum of interpersonal and intergroup conflicts. The report goes on to discuss some of the obstacles to understanding and meeting these challenges. Among the important conclusions that the Board reached concerning this matter were the following: "The tasks which these problems pose for science are immense. Although they involve the whole of science, the tasks apply particularly to the least developed of the disciplines—the behavioral and social sciences. These disciplines need to be significantly strengthened, in both their basic and applied aspects, if the Nation is to respond more successfully to its social problems. Although knowledge alone does not guarantee success its lack almost certainly reduces the chance and extent of progress." [11]

During the past few years, federally supported social and psychological research and development has become an enterprise of considerable magnitude. A Federal Council for Science and Technology report estimated that federally supported psychological and social R. & D. would total $1.128 billion in the fiscal year 1976.[12] In NSF this includes support for such subjects as psychology, anthropology, economics, history, linguistics, political science, sociology, and interdisciplinary research in social sciences, including such topics as law and social science, social indicators, problem-oriented applied social research (generally categorized in funding reports as "social sciences", NEC). (For definitions of the scope of these disciplines, see the appendix.) The fiscal year 1976 support figure constituted about 6 percent of all total Federal R. & D. outlays expected for the fiscal year 1976. Federally funded basic and applied research in psychology and social sciences, which constitutes about 40 percent of all federally funded psychological and social R. & D. was expected to total about $493.2 million, estimated for the fiscal year 1976.[13] Federal support for research in these sciences, therefore, has about doubled (in terms of current dollars) since 1966 when Federal agencies provided about $266 million for their support. The psychology and social sciences share of all Federal research support activities has stayed about the same in the 10-year period, rising slightly from about 5 percent to 6 percent. See tables 1 and 2.

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[10] This topic was also addressed at the 1975 OECD Ministerial meeting on science. According to a report of the meeting "A recurring topic that featured in the discussions of practically all the agenda items was 'the critical essentiality of the social sciences.' [One minister reported] 'Until a few years ago, science and technology were largely concerned with, and appeared to be the domain of natural sciences. Recently, however, we have come to recognize that the work of the social scientists is important in attacking the problems of man, as disinct from natural phenomena.' The ministers called for improved interrelationships between the natural and social sciences. This means that in the allocation of resources, member states recognize the necessity of more scientific resources going into the social sciences than has been the case in the past." OECD is also conducting a series of comparative studies on the social science policies of five member states including the United States, France, Canada, Norway and Japan. (O'Sullivan, Dermont. World Science Leaders Examine Social Needs. Chemical and Engineering News, July 28, 1975: 15.)

[11] Stever, H. Guyford. Whether the NSF?—The Higher Derivatives: A Changing Social Environment Will Make New Demands on the Science Community. Science, v. 189, July 25, 1975: 265. Quoting from: Report of the National Science Board, Science and the Challenges Ahead. Washington, U.S. Government Printing Office, 1974.

[12] Federal Council for Science and Technology. Report on the Federal R. & D. program, fiscal year 1976. Washington, U.S. Government Printing Office, 1975. 139 p.

[13] U.S. National Science Foundation. Federal Funds for Research, Development, and Other Scientific Activities, fiscal years 1974, 1975, 1976. Vol. XXIV. Detailed Statistical Tables. Washington, U.S. Government Printing Office, 1975. p. 29 (NSF 75-323.)

TABLE 1.—FEDERAL OBLIGATIONS FOR BASIC RESEARCH IN PSYCHOLOGY AND SOCIAL SCIENCES, TOTAL FEDERAL FUNDS AND NATIONAL SCIENCE FOUNDATION FUNDING, BY DISCIPLINE, FISCAL YEARS 1960–76, ESTIMATE [1]

[In thousands of dollars]

	Psychology				Social sciences							
	Total	Biological aspects	Social aspects	Psychological sciences (NEC)	Total	Anthropology	Economics	History	Linguistics	Political science	Sociology	Social sciences (NEC)[2]
Fiscal year 1976, estimate, total all agencies [3]	46,671	23,778	20,882	3,011	90,718	7,344	23,338	7,632	1,954	2,617	16,328	28,505
Total NSF	6,763	4,460	2,303		27,615	4,100	7,220	960	1,520	1,377	2,130	10,308
Fiscal year 1975, estimate, total all agencies [3]	47,146	28,845	20,648	2,653	82,400	8,014	25,347	6,219	2,285	2,465	18,649	19,421
Total NSF	6,063	4,090	1,973		25,187	4,100	6,270	928	1,450	1,407	1,769	9,203
Fiscal year 1974, total all agencies [3]	49,398	25,695	21,501	2,202	73,159	8,605	25,122	5,855	2,143	2,221	13,079	16,134
Total NSF	5,595	3,628	1,967		22,629	3,913	5,220	920	1,300	1,290	1,857	8,129
Fiscal year 1973, total all agencies [3]	50,892	27,583	20,726	2,583	78,311	10,665	21,712	4,645	3,059	2,676	11,361	24,193
Total NSF	10,011	7,787	2,224		24,689	3,886	4,622	898	1,253	1,431	2,383	10,216
Fiscal year 1972, total all agencies [3]	58,379	28,843	22,220	7,316	79,683	9,867	25,007	4,300	2,397	2,609	19,450	15,963
Total NSF	10,640	8,010	2,456	174	26,117	4,118	4,685	876	94	1,395	2,969	11,980
Fiscal year 1971, total all agencies [3]	48,784	25,124	20,580	3,080	69,552	8,651	24,656	3,662	1,931	2,192	15,551	12,909
Total NSF	9,303	7,027	2,276		20,225	3,999	4,443	733	137	706	2,581	7,626
Fiscal year 1970, total all agencies [3]	57,237	29,536	24,721	24,721	66,118	8,050	25,936	4,424	1,811	3,759	13,122	9,016
Total NSF	7,600	4,210	1,430	1,960	14,234	3,227	4,111	924	1,296	1,554	1,311	1,811
Fiscal year 1969, total all agencies [3]	54,704	28,669	23,899	2,136	72,247	9,211	25,615	4,125	2,294	3,253	15,823	11,926
Total NSF	6,334	4,100	2,234		15,345	3,442	4,502	452	1,312	1,328	1,706	2,603
Fiscal year 1968, total all agencies [3]	97,719	49,860	45,293	2,566	61,506	8,935	19,627	3,656	1,426	1,893	12,155	13,814
Total NSF	7,953	5,554	1,850	549	14,399	3,612	3,781	299	1,133	865	1,654	3,055
Fiscal year 1967, total all agencies [3]	60,044	36,994	23,050		56,869	9,316	20,187				12,746	14,620
Total NSF	8,040	5,622	2,418		14,869	4,152	3,641				3,219	3,857
Fiscal year 1966, total all agencies [3]	53,373	31,850	21,523		44,296	9,338	16,234				9,088	9,636
Total NSF	7,749	5,421	2,328		11,597	4,491	2,712				1,830	2,564
Fiscal year 1965, total all agencies [3]	57,763				36,931	7,536	12,127				5,955	11,313
Total NSF	7,285				11,097							
Fiscal year 1964, total all agencies [3]	47,241				34,201	7,191	10,828				5,368	10,814
Total NSF	5,715				13,059							
Fiscal year 1963, total all agencies [3]	36,129				24,901	6,504	10,769				3,813	3,895
Total NSF	5,916				8,755							
Fiscal year 1962, total all agencies [3]	27,563				18,019	3,658	8,875				3,369	2,117
Total NSF	4,699				6,702							
Fiscal year 1961, total all agencies [3]	20,901				11,439	3,321	3,955				2,884	1,279
Total NSF	3,391				2,773							
Fiscal year 1960, total all agencies [3]	17,138				8,149	2,156	3,463				2,011	519
Total NSF	2,597				1,823							

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[1] If no figure appears in a column it means that data were not available, either because a subject discipline was not funded, or because reporting did not subdivide funds into specific subject disciplines.

[2] Before fiscal year 1968, NEC was called "other". NEC means "not elsewhere classified," i.e. not falling within an existing discipline category or being interdisciplinary.

[3] Data are from the NSF annual series entitled "Federal Funds for Research Development and Other Scientific Activities," published by the U.S. Government Printing Office. Data for the fiscal years 1976 estimate, 1975 estimate and 1974 are from NSF publication No. 75-323; data for the other years are from other numbered publications as follows: 1973, NSF 74-320-A; 1972, Vol. 22; 1971, NSF 72-317; 1970, NSF 71-35; 1969, NSF 70-38; 1968, NSF 69-31; 1967, NSF 68-27; 1966, NSF 67-19; 1965, NSF 66-25; 1964, NSF 55-19; 1963, NSF 65-13; 1962, NSF 64-11; 1961, NSF 63-11; and 1960, NSF 61-82.

TABLE 2.—FEDERAL OBLIGATIONS FOR APPLIED RESEARCH IN PSYCHOLOGY AND SOCIAL SCIENCES, TOTAL FEDERAL FUNDING AND NATIONAL SCIENCE FOUNDATION FUNDING, BY DISCIPLINE FISCAL YEARS 1960–76, ESTIMATE [1]

[In thousands of dollars]

	Psychology				Social sciences							
	Total	Biological aspects	Social aspects	Psychological sciences (NEC)	Total	Anthropology	Economics	History	Linguistics	Political science	Sociology	Social science (NEC) [2]
Fiscal year 1976, estimate, total all agencies [3]	89,818	32,129	57,489	200	264,982	6,652	111,764	366	912	9,716	57,793	77,779
Total NSF	1,220	940	280		17,952		1,755			270	670	15,257
Fiscal year 1975, estimate, total all agencies [3]	85,123	31,651	53,262	210	260,329	6,701	100,876	337	877	8,857	64,908	77,773
Total NSF	1,090	840	250		17,015		1,455			240	600	14,720
Fiscal year 1974, estimate, total all agencies [3]	93,288	35,154	57,942	192	218,340	4,611	93,230	337	1,005	6,240	49,999	62,918
Total NSF	940	720	220		12,902		1,050			210	510	11,132
Fiscal year 1973, total all agencies [3]	65,544	16,582	46,598	2,364	217,943	1,149	66,706	245	1,128	4,159	89,735	54,821
Total NSF	910	700	210		12,187		2,444			209	500	9,034
Fiscal year 1972, total all agencies [3]	67,520	16,048	45,317	6,155	230,749	3,297	57,029	248	1,284	1,754	98,709	68,428
Total NSF	880	680	200		10,347		1,987			356	350	7,654
Fiscal year 1971, total all agencies [3]	66,483	14,812	44,166	7,905	236,098	3,009	49,855	516	1,148	2,911	89,099	89,560
Total NSF	180	150	30		6,228		1,538			470	280	3,940
Fiscal year 1970, total all agencies [3]	56,091	15,605	39,454	1,032	149,734	713	58,396	118	178	3,658	25,365	61,036
Total NSF	120	90	30		5,348		1,022			951	400	2,975
Fiscal year 1969, total all agencies [3]	48,665	21,260	26,492	913	147,562	1,467	52,579	116	198	5,613	28,838	58,751
Total NSF					4,438		462			238		3,738
Fiscal year 1968, total all agencies [3]	43,185	17,830	24,435	920	133,892	1,801	52,619	200	367	3,721	24,863	50,321
Total NSF					2,993		1,302					1,691
Fiscal year 1967, total all agencies [3]	47,998	10,843	37,155		131,818	1,876	49,405				37,303	43,213
Total NSF					1,191		1,191					
Fiscal year 1966, total all agencies [3]	46,958	11,571	35,387		121,319	1,912	43,771				41,124	34,512
Total NSF					1,897		1,897					
Fiscal year 1965, total all agencies [3]	45,716				90,458							
Total NSF					675		675					
Fiscal year 1964, total all agencies [3]	49,025				68,503							
Total NSF					1,076							
Fiscal year 1963, total all agencies [3]	36,277				54,918							
Total NSF												
Fiscal year 1962, total all agencies [3]	28,509				43,934							
Total NSF												
Fiscal year 1961, total all agencies [3]	29,554				32,966							
Total NSF												
Fiscal year 1960, total all agencies [3]	21,103				26,705							

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[2] Before the fiscal year 1968, NEC was called "other." NEC means "not elsewhere classified," i.e., not falling within an existing discipline category or being interdisciplinary.

[3] Data are from the NSF annual series entitled "Federal Funds for Research Development and Other Scientific Activities," published by the U.S. Government Printing Office. Data for fiscal years 1976 estimate, 1975 estimate, and 1974 are from NSF publication No. 75-323; data for the other years are from other numbered publications as follows: 1973, NSF 74-320-A; 1972, volume 22; 1971, NSF 72-317; 1970, NSF 71-35; 1969, NSF 70-38; 1968, NSF 69-31; 1967, NSF 68-27; 1966, NSF 67-19; 1965, NSF 66-25; 1964, NSF 65-19; 1963, NSF 65-13; 1962, NSF 64-11; 1961, NSF 63-11; and 1960, NSF 61-82.

Although the Federal Government has continued to allocate considerable expenditures for psychological and social sciences research, the topic of Federal support for these sciences seems to be as controversial today as it was in 1950, when the Congress originally opposed giving the Foundation an explicit mandate for their support. In 1968, the Congress reversed its earlier decision and gave the NSF explicit authority to fund social sciences research. Nevertheless, criticism about Federal involvement in these areas, especially NSF research support for these topics, seems to have heightened considerably in recent years, resulting not only in charges of wasted expenditures and useless information, but also in the formation of numerous study groups to assess psychological and social sciences research priorities, management, and utility.

Several complex issues seems to underlay much of the current disenchantment with these sciences. However, two issues seem to be paramount: first, expectations for the behavioral and social sciences frequently far outreach the immediate capability of these disciplines to produce policy-relevant information; and second, there seems to be a lack of appreciation for the fact that social science information alone (without political consensus on the need for programmatic application of that information) will not solve social problems. Several specific factors contribute to these problems. These will be detailed in succeeding sections of this chapter. In brief they are: a preference for Federal agencies to fund applied rather than basic social and psychological sciences research; inadequate assessment of priorities for research support; the possibility of over-emphasizing the funding of rigorous quantitative basic research to the detriment of less rigorous normative and institutional basic research studies; and a lack of appreciation for the limitations of policy-relevant psychological and social sciences research.

A. TRENDS IN FEDERAL SUPPORT OF PSYCHOLOGICAL AND SOCIAL SCIENCES: THE CONCENTRATION ON FUNDING APPLIED RESEARCH

The pattern of Federal funding for basic and applied psychological and social research undoubtedly contributes to many of the dilemmas confronting these sciences. The Federal Government probably is the Nation's largest supporter of basic and applied psychological and social research. However, typically and especially during the last few fiscal years, Federal support for applied research in these disciplines has exceeded by a multiple of three, the amount of Federal support for basic research in these disciplines. In fact the Committee on the Study Project on Social Research and Development of the National Research Council estimated that basic research in social sciences constitutes about 10 percent of all Federal outlays for research and development in these fields.[14]

The tendency to fund applied rather than basic psychological and social research, a support pattern which is the opposite of Federal funding trends for the "harder" sciences, such as physics,[15] obviously curtails the conduct of basic research whose principal objectives are to accumulate knowledge and explanations of the fundamental aspects of human behavior.[16]

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[14] Glennan Thomas K., Jr. "The Study Project on Social R and D," an interim report of the Committee, National Academy of Sciences, July 1975: p. 4.

How do the funding patterns of the National Science Foundation, the Federal agency charged with primary responsibility for the strengthening of American science relate to these trends? During the fiscal year 1976 estimated, the NSF will support about 11 percent of all federally funded basic and applied psychological and social sciences research. NSF support for basic research in psychology and social sciences constitutes about 25 percent of total Federal outlays estimated for basic research in these fields in the fiscal year 1976. Basic psychological and social sciences research in NSF constitutes about 64 percent of the Foundation's total research responsibilities in these disciplines, for the fiscal year 1976, estimated.

However, NSF expenditures for basic and nonproblem oriented applied research in psychology and social sciences, as a total percent of NSF expenditures for research, have decreased considerably since the inception of the Research Applied to National Needs (RANN) program in 1971. For instance, in the fiscal year 1966, 9 percent of total NSF research funds went to support basic and applied nonproblem oriented psychological and social research, and in the fiscal year 1970, these areas received about 10 percent of total NSF expenditures for research; in the fiscal year 1976, basic and applied nonproblem oriented research in these sciences was expected to constitute about 5 percent of total NSF expenditures for research.[17]

Preferences for funding applied and problem-oriented psychological and social sciences research seem to have originated in the mid- and late-1960s when increasingly large Federal investments began to be allocated to solve intractable social problems. The National Science Foundation's RANN program played a major role in this support pattern. Social problem-oriented research in RANN was required by congressional mandate to total at least $23 million in the fiscal year 1976[18] (subsequently reduced to $19.5 million, following application of the proportionality reduction necessitated by the fiscal year 1976 Appropriations Act.) It seems reasonable for decisionmakers to expect useful payoffs from applied research. The question remains, however, whether it is premature to allocate over two-thirds of total Federal psychological and social sciences research resources to applied and policy research, whose findings must necessarily be based on only a small amount of previously accumulated basic knowledge.

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[15] These patterns are detailed in a report prepared for the House Committee on Science and Astronnautics in November 1974. The report notes, in part, ". . . During the four fiscal years of 1959, 1964, 1969, and 1974 estimated applied research in the psychological and social sciences consistently received the bulk of the funds awarded for these areas. To be more precise, only 22 percent of the funds awarded for basic and applied research in psychological and social sciences during the fiscal year 1959 went to basic research. Figures for other years are: 1964, 41 percent; 1969, 40 percent; and 1974 estimated, 38 percent. . . . This can be contrasted with the patterns of Federal expenditures for physical sciences research. For the same fiscal years, 1964, 1969, and 1974 estimated 61 percent, 70 percent, and 62 percent of support funds for physical sciences went to basic research. (Government Science Policy: "Some Current Issues on Federal Support and Use of the Behavioral and Social Sciences." Statement prepared in accordance with the request of the Science and Astronautics Committee. By Genevieve J. Knezo, analyst in science and technology, Science Policy Research Division, Congressional Research Service, Library of Congress, Nov. 18, 1974. In U.S. Congress. House. Committee on Science and Astronautics. Federal Policy, Plans, and Organization for Science and Technology, part II. Hearings, June and July 1974. 93d Cong., 2d sess. Washington, U.S. Government Printing Office, 1974. p. 524.)

[16] It should be that in terms of constant dollars Federal funding for basic research in psychological and social sciences probably has decreased; and that this trend is not unique to federally supported basic research in the social and behavioral sciences. On this point Dr. Richard Atkinson, as Deputy Director of the NSF reported: ". . . The number of dollars (adjusted for inflation) spent on applied research has increased about 2 percent from 1967 to the present; during the same period funding for basic research has declined about 20 precent. This is a serious problem. Our country is on a downhill course where basic research in all sciences is rapidly being eroded. If we are not careful, we will soon reach a point where this country will no longer be able to compete internationally in research and technology." ("Some Issues Regarding the Future of Basic Research in Universities." Proposed remarks of Dr. Richard C. Atkinson, Deputy Director, National Science Foundation, National Council of University Research Administrators, Nov. 7, 1975, manuscript, p. 6.)

[17] For full details, see table 11. Data released after this report was written indicate that for the fiscal years 1977, estimated and 1978, estimated, basic and applied nonproblem oriented research will constitute about 7.5 percent of such research expenditures.

B. THE NEED TO IDENTIFY PRIORITIES FOR RESEARCH SUPPORT

Another current issue, with considerable import for the funding patterns of the National Science Foundation, is whether enough attention has been given to assessing Federal funding patterns and the state-of-the-art of psychological and social sciences research to identify both the accomplishments generated by previous expenditures and the lagging areas which might warrant additional research investment.

1. *Legislative concern for improving policies for the support and use of the psychological and scoial sciences.*—Both legislative and executive branches of the Government have expressed concern about this issue and about improving policies for the support and use of social and psychological sciences research. For instance, on December 10, 1975, Senator William V. Roth, Jr., introduced a bill to establish procedures for oversight of Federal social research and development (S. 2766). The Senator explained the need for the bill as follows: "One reason that Congress has been unable to work its will on what turns out to be massive outlays for social science research and development activities is that these expenditures are scattered throughout the Federal Establishment . . . frequently buried in broad program categories." He continued by noting that Federal social research and development programs are characterized by inappropriate management and coordination. As a result there is considerable duplication of effort and only a meager yield of practical returns for Federal research investment. The proposed legislation was designed to assist with oversight of social research and development and to provide better data to help the Congress meet its obligations for oversight. It included three specific provisions:

> First, that beginning with the fiscal year 1978 budget submission, each agency will be required to submit with its budget presentation, a detailed statement of its social research and development plans; second, that all research and development contracts, grants, or fund transfers which exceed $25,000 in cost, must be cleared in advance by the Office of Management and Budget; and third, that agencies must have available for public inspection at the principal offices, summaries of all social research and development contracts, grants, and fund transfers.[19]

2. *Inadequacies of previous studies.*—During the last few years, numerous inventories of psychological and social research programs have

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[18] Sec. 2(a)(9) of Conference Report on NSF Authorization Act, 1976. U.S. Congress. House Committee on Conference. National Science Foundation Authorization Act, 1976. Conference Report to accompany H.R. 4723. 94th Cong., 1st sess. Report No. 94–422. July 30, 1975. Washington, U.S. Government Printing Office, 1975, p 2.

[19] Statement of Hon. William V. Roth. "On introduction of S. 2766, the Social Research and Development Oversight Act of 1975." Congressional Record (daily ed.), Dec. 10, 1975: S21595–21596.

been conducted. Several Federal agencies, for instance, have assessed research needs for their own support programs.[20] In addition, social scientists have conducted their own surveys, sometimes with Federal funding. Apparently these studies have not always provided policymakers with an adequate picture of Federal priorities, expenditures patterns, and research needs. Most of the studies done by social scientists have been faulted on the grounds that social scientists were unwilling to undertake a critical and comprehensive assessment of the strengths and weaknesses of their disciplines. As a result, Federal agencies, sometimes have found it difficult to identify lagging or promising areas of social research. The following excerpt, from a study published in 1974 by the House Committee on Science and Astronautics, describes some of these past efforts:

> Several attempts have been made to inventory the state-of-the-art and the needs of the behavorial and social sciences and to recommend federal spending priorities. For example, social and behavioral scientists affiliated with the Committee on Science and Public Policy of the National Academy of Sciences provided statements along these lines for the House Committee on Science and Astronautics during 1965 and 1967. (Pfaffmann, Carl, "Behavioral Sciences." In U.S. Congress, House, Committee on Science and Astronautics. Basic Research and National Goals. A Report. Washington, U.S. Govt. Print. Off., 1965, pp. 230, 234–235. Bauer, Raymond E. Application of Behavioral Science. In U.S. Congress, House, Committee on Science and Astronautics. Applied Science and Technological Progress. A Report, Washington, U.S. Govt. Print. Off., 1967, pp. 95–136.) The Research and Technical Programs Subcommittee, (the Reuss Subcommittee), of the House Committee on Government Operations conducted a survey of social scientists inside and out of government with the intention of holding hearings on the need to improve Federal priorities in these areas. (U.S. Congress, House, Committee on Government Operations, Subcommittee on Research and Technical Programs. The Use of Social Research in Federal Domestic Programs. A Staff Study, 90th Congress, 1st session, April 1967, Washington, U.S. Govt. Print. Off., 1967. Four Volumes: Part I, Federally Financed Social Research, Expenditures, Status, and Objectives: Part II. The Adequacy and Usefulness of Federally Financed Research on Major National Social Problems; and Part IV, Current Issues in the Administration of Federal Social Research.) More recently, the Behavorial and Social Sciences Survey Committee (BASS), of the National Academy of Sciences and the Social Science Research Council prepared a summary report and separate disciplinary reports on the need for improved priorities for developing the behavioral and social sciences. (The summary report is: National Academy of Sciences, Behavorial and Social Sciences Survey Committee. The Behavioral and Social Sciences; Outlook and Needs. Washington, U.S. Govt. Print. Off., 1969.)

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[20] These studies include reviews of economic and sociological research in the Department of Agriculture (Agriculture: Social Sciences Oppressed and Poverty Stricken. Science, v. 180, May 18, 1973: 719–721); an assessment of priorities and objectives for basic and policy research in income maintenance and employment, health, other human services and statistical research, by the Assistant Secretary for Planning and Evaluation, HEW (Cues of Policy Research. Behavior Today, Oct. 14, 1974: 263–264); a review of applied, problem oriented and policy research on social problems; biological and physiological processes, psychological processes, social and cultural processes, mental illness and behavior disorders, drug abuse, alcoholism treatment techniques, mental health services and research information, and dissemination and utilization, by the National Institute of Mental Health (Problem Research Problems, Behavior Today, Apr. 23, 1973. 1–3): a 2-year study of accomplishments and needs in mental health research by the National Institute of Mental Health (Mental Health Research Review, Behavior Today, Feb. 3, 1975: 379–380); a "Forward Plan for Health, fiscal years 1977–81 by the National Institute of Mental Health (stressing the need for basic behavioral science research and for clinical research and psychopharmacology), (Budget Spells NIHM Priorities. Behavior Today, Oct. 20, 1975, 593–594). Also related is the ongoing work of the National Commission for the Protection of Human Subjects in Biomedical and Behavioral Science, created by Public Law 93–348, 1974. The Commission has studied the subject of experimentation in fetal research and is now studying the problems and ethics of research in "psychosurgery . . . ; biomedical and behavioral research, research on children . . . research involving prisoners, and . . . research on the retarded." (Commission Shift, Behavior Today. Sept. 29, 1975 : 574.)

> "Dr. Harold Orlans, who conducted the study for the Reuss Subcommittee summed up the pecunious and uncritical nature of most of these reports:
>
> The policies which academic social sciencies have advocated can be summed up in one word, *more*: more money for research and especially for basic research; more money for training; more block grants which members of the academic staff may use for research of their own choice; more freedom from Government application, accounting, and reporting requirements; a more attentive and respectful governmental reception for their findings; and more evidence that some use is occasionally made of them." (Orlans, Social Science Research Policies in the United States, op. cit.: 23.)
>
> Commenting on the "give us more" nature of the responses he obtained in his survey for the Congress, Orlans reports: ". . . The overall impression given was one of striking out in all directions at once; of the absence of clear and convincing priorities; and of a widespread inability to distinguish between the order of knowledge which can and that which cannot be obtained by empirical research." (Orlans, Harold. Contracting for Knowledge, San Francisco, Jossey-Bass Publishers, 1973, p. 117). He also reports that this uncritical attitude held by social scientists prevented the Congress from holding hearings on the need to reorder funding priorities: (Orlans, Harold. Criteria of Choice in Social Science Research, Minerva, v. 10, October 1972 : 579).
>
> . . . In trying to set up hearings which might warrant recommendations for increasing the amount of designated kinds of research and, conversely, not increasing or reducing the amount of other kinds . . . we sought and failed to obtain testimony which designated types of research which should not be supported. Even scholars most critical of the quality of government social programmes drew back from that sort of statement. Our resultant inability to make a cogent case for reordering social science research programmes in any definable and administrable manner was the main reason why, in the end, hearings were never held. (Orlans, Social Sciences Research Policies in the United States, op. cit. : 20)."[22]

3. The objectives of some current studies.—Several additional comprehensive studies of federally supported psychological and social research are now underway. The most comprehensive is that of the Committee on the Study Project on Social Research and Development of the Assembly of Behavioral and Social Sciences of the National Research Council. The research is funded by the Science and Technology Policy Office of the National Science Foundation. A final report is expected in December 1976. An interim report, released in July 1975, explained the committee's view of the need for this study and some of the obstacles the committee has encountered:

> For a number of years, senior government officials have been expressing serious concerns about the numerous research and development programs that are focused on social problems. They have had a sense that the work produced in these programs is of little value to them in formulating social policy and that it is of low quality. Decision makers from OMB have found that important problems that are the joint responsibilities of several agencies seem to receive little attention. Moreover, they have not even been able to get a clear and concise picture of the extent and nature of support for social and R and D. The Study Project on Social R and D has been funded by NSF to examine the social R and D enterprise, to investigate the merit of these concerns, and to make recommendations for improvements in the organization and management of the federal support of social R and D. . . .
>
> In order to advance answers to these questions, the committee has felt the need to examine current activities of government agencies, as well as to seek to clarify the way social R and D has influenced policy. Consequently, a series of studies are underway that will provide insight into these issues.

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[22] Government Science Policy: Some Current Issues on Federal Support and Use of the Behavioral and Social Sciences, op. cit., pp. 539–540.

The second phase of the project has posed some quite basic questions:

> **What are the proper functions of the social R. & D. enterprise? How is and how should social research and development be used in social policy making? What is a meaningful definition of policy relevance?**
>
> **Are there preferred means to organize and manage federal support of social R. & D.? How should non-research people be involved?**
>
> **Does the current organization of the [F]ederal government mean that some questions or functions receive too little attention? Does research that crosses agency jurisdictions get slighted? Is too little attention paid to the use of R. & D.?**
>
> **Would the enterprise be improved by some form of overarching policy structure (perhaps orchestrated by the Domestic Council or the Science Adviser?)[22]**

C. THE NEED FOR A BALANCED PERSPECTIVE ON PRIORITIES FOR THE SUPPORT OF BASIC SOCIAL AND PSYCHOLOGICAL SCIENCES RESEARCH: QUANTITATIVE VERSUS NONQUANTITATIVE STUDIES

Recommendations that psychological and social scientists take stock of the state-of-the-art of their disciplines pervade much of the current literature.[23] Some have suggested that such an inventory of the state-of-the-art and achievements of the disciplines encompassed by the psychological and social sciences might help improve the determination of research priorities for them. Such a stocktaking might also have several implications for the management of Federal psychological and social sciences research programs. These include: (1) the need to give a balanced perspective to the apparent present emphasis on quantitative basic research in contrast to emerging needs to consider more support for case and institutional studies, as well as for facilities and time-series data bases; and (2) the need to better understand the relative contributions and limitations of basic and applied psychological and social sciences research in the formulation of public policy.

Considerable attention has been given to assessing whether the complexity of the subject matter of the social sciences and the lack of uniform laws of human behavior make it infeasible for social and behavioral science to use rigorous methods of scientific inquiry (including experimentation, quantification, and verification), and for the science of the social and behavioral sciences to be judged by the rigorous canons of scientific inquiry used in the natural and physical sciences. Gunnar Myrdal, an economist and social scientist of considerable repute has summarized this position:

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[22] "The Study Project on Social R and D," op. cit., pp. 1, 2, and 3. Regarding the other studies now underway: The GAO is conducting a survey of Federal support and use of social science research for Senator Humphrey. The study began in the Summer of 1975. An FCST Subcommittee on Social R and D held its first planning meeting in November 1975. The committee is chaired by Dr. William Morrill, Assistant Secretary for Planning and Evaluation, Department of Health, Education and Welfare. Dr. Ernest Powers, of the Science and Technology Policy Office, NSF is the executive secretary. The committee is composed of officials at the assistant secretary level. The committee has not yet released information about its objectives. Apparently the meetings are not open to the public. An Advisory Committee on Social Indicators Research and Use was established on Nov. 18, 1974. It will "provide advice relating to: (a) the planning and organization of a biennial report on social indicators, and (b) the development and analysis of social statistics for use in the construction of a system of social indicators and social accounts." The committee is chaired by the Deputy Associate Director for Statistical Policy, OMB. (Federal Regiser, vol. 39, No. 229, Nov. 26, 1974.) The Stanford Research Institute is currently conducting a study of R and D planning procedures of 15 Federal agencies on a contract from the National Bureau of Standards ETIP program. The study is designed to evaluate practices leading to the application of research. (Contract Issued for Review of Federal Programs Science and Government Report, Nov. 1, 1975, 5.) Title III of the National Science and Technology Policy and Organization Act of 1976 (Public Law 94–282, approved May 11, 1976) establish a survey committee to investigate and report to the President on a wide range of issues relating to science and technology, including basic and applied research.

[23] For instance, see Reissman, Leonard, "Social Sciences, Future Tense," Science, vol. 186, No. 4169, Dec. 20, 1974: editorial page.

> **It is fruitless to expect that in the social sciences we ever will reach down to the type of universal and unchangeable, generally valid regularities of relationships between facts that the researchers in the simpler natural sciences endeavor to establish. We are dealing with the behavior of human beings each of whom has a soul, and is in the widest sense of the word influenced by his living conditions. These vary widely and change in time as in their relationship to behavior.**
>
> **To emulate the form but not the substance of research in the natural sciences is no solution to our methodological problems. Too often an analysis which is paraded as particularly strict and rigorous is, when critically scrutinized, found to be not only empty but grossly mistaken, lacking in both adequacy to reality and logical consistency.**
>
> **If we are aware of [values and biases and the gulf between them and the realities of society] and are prepared to take the consequences of the difference, we are certainly entitled to look upon our work as scientific—in the sense that we are seeking true knowledge about man and his society.[24]**

Myrdal's position, and those of others holding this view,[25] represents, in effect, a movement away from the behavioral revolution which began in the 1960's with the advent of quantification, mathematical analysis, and model building in the psychological and social sciences. It is difficult to determine whether the "behavioral revolution" was part of a natural course of events in the development of the disciplines, part of a fad, or influenced by the preferences of Federal research sponsors. Nevertheless, it is clear that the development of quantification, mathematical analysis and models gave the social sciences a certain element of scientific legitimacy which permitted them to become acceptable fields of scientific inquiry in some Federal agencies, notably the National Science Foundation.

Since their inception, the National Science Foundation's basic and applied scientific research support programs for the psychological and social sciences have been predominantly quantitative in orientation. The Foundation appears to have adopted this orientation because social scientists seem to have favored "methodologically and mathematically rigorous studies" and because it was necessary to justify NSF support for psychological and social research, on grounds similar to those for "harder sciences," to a Congress skeptical of the Foundation supporting potentially "politically sensitive" social science research. Foundation officials have continued to use this rationale in justifying the agency's programs to successive and sometimes still skeptical Congress. However, some social scientists are beginning to question the thesis that scientific merit and relevance in psychological and social sciences research must be judged in terms of quantitative rigor. They are also questioning whether the Foundation is overemphasizing the use of quantitative methods of the physical and natural sciences in fields of study whose subject matter does not always lend itself to rigorous mathematical expression.

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[24] Myrdal, Gunnar. How Scientific are the Social Sciences? Journal of Social Issues, vol. 28, No. 4, 1972: 169–170.

[25] For instance, Marc Roberts has catalogued the uses and abuses of quantification and modelling in social research, recommending that social scientists take stock of the "explanatory exactness and generality" likely to be found in the social sciences, and that they move away from the oversimplification of social variables exhibited in many mathematical or modelling studies. (Roberts, Marc. "On the Nature and Condition of Social Science." Daedalus, vol. 103, No. 3, Summer 1974: 47–64.)

Harold Orlans, a social scientist who was the project manager for the study on "The Use of Social Research in Federal Domestic Programs," conducted in 1967, by the Research and Technical Programs Subcommittee of the House Committee on Government Operations, notes similarly: A guiding criterion of social science research policy should be precisely the opposite of that which governs scientific research: to describe and explicate the social and historical context of the work. People should be described as people—as children, citizens, unemployed blacks or busy congressman—not as abstract and timeless "subjects": institutions as specific organizations with stated characteristics, not as an abstract form which exists only in the academic mind; and data as the residue of certain procedures employed by designated persons, not as elementary particles of an unchanging universe. The "who, what, when, where, why" which tyro journalists learn to include in the first paragraph of a news story, but which senior social scientists often omit in their work, should be fully reported since, like archaeological findings, one can interpret the significance of social findings only by knowing their original provenance. . . . Since all social data have an historical context, their probity and force should be determined by the same tests of proximity, authenticity, and authority normally applied to the evaluation of historical evidence. (Orlans, Harold. Criteria of Choice in Social Science Research. Minerva, vol. 10, October 1972: 601.)

Obviously, it is necessary for agencies of the Federal Government to fund different types of research; and there is strong support that such research must be balanced appropriately between quantitative and normative studies. For instance, Stuart Nagel, a leading proponent of policy research, indicates that quantitative research prevents both social scientists and policymakers from overemphasizing "evaluative gut reaction, armchair speculation, and isolated historical anecdotes." However, at the same time, normative studies provide " a high level of abstraction [about] . . . ultimate-type causes as to why societies make certain basic policy choices." [26]

On this same point, Irving Louis Horowitz, reporting in a study prepared for the Organization for Economic Cooperation and Development's comparative review of social science policies in member countries, noted that the use of quantitative social research methods ". . . is an inevitable consequence of the drive of policymakers for quantitative information that can easily be justified, correlated, and tabulated. . . . [B]ut it is clearly the case that a great many of the problems that individuals, communities, and nations alike have are precisely in the area of 'quality of life,' in more ubiquitous framework of social values and social norms . . . problems of how good, no less than now how much." [27] "For this reason," he argues that support and use of social sciences should not be ". . . limited to simple management techniques or engineering problems, but rather [should] take cognizance of those murky, gray areas of psychology and politics that are perhaps less subject to quantification but at least useful in their findings for the framing of individual needs and national goals."

D. THE DIFFICULTIES OF PREPROGRAMMING PRIORITIES FOR BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL RESEARCH

Current discussions about social science policy include yet another complex issue: the need to give appropriate consideration to assessing whether priorities for basic social and psychological research can be preprogrammed. A special task group of the Advisory Committee on Research of the National Science Foundation completed a report in November 1975, assessing the importance of the social sciences as part of the Federal research support mission. The group noted that the issue of determining priorities for social science research in NSF is especially important because "A number of the critics of existing policy have wanted a criterion of utility to be applied to each of the proposals seeking support from the National Science Foundation or other funding agencies."[28]

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[26] Introduction. Policy Studies and the Social Sciences. Edited by Stuart S. Nagel. Lexington. Lexington Books, 1975. p. xiii.

[27] Horowitz, Irving Louis and James Everett Katz. Social Science and Public Policy in the United States. New York, Praeger Publishers, 1975. p. 164.

Both this group and the Research Task Force of the National Institute of Mental Health recently examined issues surrounding the application of social utility criteria to social and behavioral science research, as well as the issues of laying out in advance basic research support programs which would be designed to promote specific useful scientific advances and applications of findings to policymaking. Both groups came up with essentially the same conclusions: "that the scientific process is threatened when research must fit preconceived notions of what is relevant, and that basic research cannot be programed or planned in the manner of more applied research."[29] NIMH's study assessed the role of basic research in all areas of its work encompassing programs on biological influences on behavior, psychological influences on behavior, mental illness and behavior disorders, human development, alcohol abuse and alcoholism, drug abuse, social problems, and mental health and mental health treatment. With respect to the importance of basic research in these areas, the task force concluded in greater detail:

> A specially important role has been played by basic biological and behavioral studies, those not specifically hinged to a particular problem area. Although such basic research offers no guarantees, no specific end-products, this report underscores its crucial role in mental health as the foundation on which all applications must rest.
>
> Basic research is forbidding to many nonscientists, and its language and procedures require an intellectual initiation that is not available to everyone. It is difficult even for the scientists to predict when an isolated and seemingly useless finding—as the discovery of serotonin may have seemed in its time—will come to fruition in an unexpected nexus, such as the present attempts to understand basic functions of the nervous system through its response to psychoactive drugs.[30]

The NSF Advisory Committee's study assessed three types of social sciences research: demographic research, survey research, and research used in formulating policy on income maintenance. Summarizing the importance of basic research to these developments as well as to all of the National Science Foundation's support programs for the social and psychological sciences, the committee concluded, like the NIMH group:

> We do not doubt [that a social utility] criterion can be applied to a number of projects with short-term utilitarian goals. It is a natural tool of planning within many of the applied programs of research lodged in the Federal Government but, however, desirable it might seem, it would be impossible to apply such a criterion to the planning of support for many of the types of research funded by the National Science Foundation—research which may nonetheless return a substantial benefit to the Nation.
>
> Once a line of scientific work begins to unfold it usually has an internal logic of development which provides the key to what should be done or supported

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[28] National Science Foundation. Advisory Committee on Research. Report of Task Group No. 10. The Social Sciences as a Research Area in the National Interest. November 4, 1975. Typescript, p. 15.

[29] Research in the Service of Mental Health: Report of the Research Task Force of the National Institute of Mental Health. Prepared by Task Force Staff and Coordinating Committee with Herbert Yahraes. Ed. by Julius Segal. Washington, U.S. Government Printing Office, 1975. p. 148. (DHEW Publication No. (ADM) 75–236.)

[30] Research in the Service of Mental Health. Summary Report of the Research Task Force of the National Institute of Mental Health. Prepared by Task Force Staff and Coordinating Committee with Herbert Yahraes. Edited by Julius Segal. Washington, U.S. Government Printing Office, 1975. p. 84, (DHEW Publication No. (ADM) 75–237.)

next, as was true in the development of the mathematical methods for estimating the natural increase of population. The uncertainty of knowing beforehand whether and how a particular line of work will yield a social return means that scientific rather than utilitarian criteria will often be a better guide to the planning of support even if the investigator and the funding agency are keenly interested in the social value of the research in the middle or longer run. We would, therefore, counsel against attaching a criterion of relevance or social value to particular projects competing for support.

If it were more widely understood that the planning of research support, like any program of investment in the presence of uncertainty, entailed a degree of risk, there might be less pressure to find ways of assuring a return on each project.[31]

E. POLITICAL OBSTACLES TO THE USE OF PSYCHOLOGICAL AND SOCIAL RESEARCH

Another important issue which arises in discussions about Federal funding of social and psychological research is the need to give a balanced perspective to the potential relevance or utility of basic and applied social research for policymaking purposes. Considerable recent criticism has been levied at some of this research on the grounds that it is too esoteric, nonuseful, jargon-laden or complicated for use in policymaking. Undoubtedly this claim is true in many cases. Much basic and applied research is not intended to serve the immediate needs of policymakers. Furthermore, as illustrated by several recent studies, some policymakers will not use the results of policy-oriented psychological and social research if the results are counterintuitive to their beliefs or if the findings are politically unacceptable.[32]

Addressing this point in his 1975 presidential address to the National Academy of Sciences, Dr. Philip Handler recommended, however, that social science research funding continue vigorously despite the discomfort it may cause to some decisionmakers:

> Such research frequently deals with matters relating to our social, ethnic, financial, religious, personal, and political behavior. The business of all science is the search for truth. Research in the social sciences requires defense and protection by the entire scientific and intellectual community precisely because the findings of such research maybe uncomfortable for the established order of our society.[33]

As noted above, a social sciences task group of the Advisory Committee on Research of the National Science Foundation completed a report in November 1975 which assessed three social science developments nurtured with Federal research funds. Traced were the developments of demographic research, survey research, and research used in formulating policy on income maintenance, from their origins as topics of basic research support, through their development and application. In assessing the utility of these fields of research and development to policymaking, the group raised several important issues about political barriers to utilization and the need to supersede them:

> Research can make important contributions to the process of problem solving. It can recognize certain problems, as demographic research sketched the disaster

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[31] The Social Sciences as a Research Area in the National Interest. op. cit., pp. 15, 16.

[32] These issues are detailed in, for instance: Reissman, Social Science, Future Tense, op. cit., and Caplan, Nathan, Andrea Morrison and Russell J. Stambaugh. The Use of Social Science Knowledge in Policy Decisions at the National Level. A Report to Respondents. Ann Arbor. The Center for Research on the Utilization of Scientific Knowledge. Institute for Social Research. University of Michigan. 1975. 55 pp.

[33] Quoted in Handler Defends Science. Behavior Today, May 12, 1975 : 472.

> **that lay ahead if the natural increase of the world's population went unchecked. It can provide the methods and data to judge what would follow from alternative courses of action, including their side-effects, as the income maintenance experiments studied the effect of the negative income tax on the will to work. And it can help evaluate in retrospect the effectiveness of the course of action that was taken. But the full process of recognizing and dealing with major national problems requires political decisions and a range of efforts in the public and private sectors that are beyond the province of research.[34]**

F. CURRENT STUDIES OF NSF'S PSYCHOLOGICAL AND SOCIAL RESEARCH PROGRAMS

In authorizing NSF's fiscal year 1976 budget, the Congress put a spending floor on RANN problem-oriented social research while at the same time the Senate Appropriations Committee, for the second year in a row, directed the Foundation to tighten spending for basic and applied social research. The current critical climate for social research, shaped in part by the issues described thus far in this chapter, as well as the reorganization of the Foundation's research directorate, has prompted the formation of several groups to assess the management and priority-setting mechanisms for Federal social research programs, including those of the NSF. A brief review of some of these activities follows.

1. The Subcommittee on Social Sciences of the National Science Board.—The Subcommittee on the Social Sciences of the National Science Board looked at the administration of social sciences programs in the Divisions of Biological and Medical Sciences and of Social Sciences, and in the RANN program to determine if the programs were being administered according to National Science Board Policy.[35] The chairman of the committee reported that the subcommittee concluded that policies were being followed.[36] The subcommittee will continue to look at the Foundation's social sciences program and is awaiting further information from the NSF, as well as from the Committee on the Social Sciences in NSF, established in the National Research Council.

2. An Internal NSF Management Report.—A second study, completed in February 1975, consisted of an internal report prepared by an NSF committee chaired by Dr. Joel Snow, former director of NSF's Office of Planning and Resources Management. This report, which was not made public due to lack of consensus about its findings, looked at programmatic and policy issues in both RANN and the Division of Social Sciences. Among the recommendations of the report were that the Division of Social Sciences adopt utility criteria similar to the criteria used in the RANN program; that the Division improve its determination of priorities for basic and applied research support; and that consideration be given to forging a closer management link between RANN and the Division of Social Sciences. Particularly emphasized were the needs for more clustering of projects in the Division to improve priority setting and reporting and for giving better public visibility to the rationale and content of some of the Division's programs.

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[34] The Social Sciences as a Research Area in the National Interest, Ibid., pp. 12–14.

[35] The members are: Dr. F. P. Thieme, Professor of Anthropology, University of Colorado, chairman; Anna J. Harrison, Professor of Chemistry, Mount Holyoke College; Roger W. Heyns, President, American Council on Education; and Mr. William H. Meckling, Dean, The Graduate School of Management, the University of Rochester.

[36] Telephone conversation with Dr. F. P. Thieme, February 1976.

3. The Report of the Social Sciences Task Group of NSF's Research Advisory Committee.—A third study was conducted by Task Force 10 of the NSF Research Advisory Committee. The study was chaired by Dr. Donald Stokes of the Woodrow Wilson School at Princeton. As noted above, the study evaluated the contributions of Federal funding to three important developments in social science: demographic research, survey research, and research used in formulating policy on income maintenance.

The study, released in November 1975, concluded that Federal support for social science cannot use a criterion of social utility, because it is impossible to predict the utility of discrete basic and applied social research projects. Furthermore, it is not possible to preprogram priorities for basic social sciences research support.[37]

4. The National Research Council's Committee on the Social Sciences in the National Science Foundation.—A fourth study, begun formally in September 1975, is that of the Committee on the Social Sciences in the National Science Foundation, chaired by Dr. Herbert Simon, professor of psychology at the Carnegie-Mellon Institute.[38] The study was undertaken shortly after the recent NSF reorganization at the direct request of Dr. Richard Atkinson, then Deputy Director, now Director, of the Foundation and a psychologist. The study was designed to assess the origin, evolution and accomplishments of NSF social and behavioral research programs. The committee evaluated management issues, and prepared recommendations on research priorities, especially on NSF's future commitments to psychological and social research. Also treated were the issues of the appropriate mix between basic and applied research support and of coordination both within the Foundation and between NSF and other agencies. (The committee released interim and final versions of its report after this study was drafted. [39] For a review of the principal findings and recommendations, see appendix D.)

5. The NAS committee on the study project on social research and development.—A fifth study, not addressed specifically to the NSF but related to its responsibilities in social science, is that of the National Academy of Sciences' Committee on the Study Project on Social Research and Development, formed under the auspices of the Assembly of Behavioral and Social Sciences. Dr. Donald Stokes, also chairman of the social sciences task group of the National Science Foundation's Research Advisory Committee, is the chairman of this study. The assembly study was funded by the Science and Technology Policy Office of the NSF, in 1974. A final report is due in December 1976.

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[37] The Social Science as a Research Area in the National Interest, op. cit., passim.

[38] Other Committee members were: Eleanor Jack Gibson, Cornell University; Leo A. Goodman, University of Chicago; Zvi Griliches, Harvard University; Charles V. Hamilton, Metropolitan Applied Research Center, New York City; Gardner Lindzey, Director, Center for Advanced Study in the Behavioral Sciences; James G March, Stanford University; James V. Neel, University of Michigan; William D. Neff, Indiana University; Marc Nerlove, Northwestern University; William Sewell, University of Wisconsin; Eleanor B. Sheldon, Social Science Research Council; Anthony F. C. Wallace, University of Pennsylvania; Sherwood L. Washburn, University of California, and Frank H. Westheimer, Harvard University.

[39] The interim report is: Committee on the Social Sciences in the National Science Foundation. Assembly of Behavioral and Social Sciences, National Research Council. Social and Behavioral Sciences Programs in the National Science Foundation. Washington, D.C., National Academy of Sciences, 1976, 96 p. The final report, with conclusions somewhat different from those of the interim report, is: Social and Behavioral Science Programs in the National Science Foundation. Final Report. Washington, D.C., National Academy of Sciences, 1976. 103 p.

Thomas K. Glennan, former director of the National Institute of Education, is executive director of the study. The group's tasks include a survey of federally supported R. & D. to obtain a better picture of expenditures and an assessment of the use of social sciences. Case studies will be undertaken. The issues of procurement and policy relevance of social science will also be addressed.[40]

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[40] The study project on social R. & D., op. cit. Committee members are: Donald E. Stokes, chairman, Princeton University; Robert McCormick Adams, University of Chicago; Frederic O'R. Hayes, New School for Social Research; Lester B. Lave, Carnegie Mellon University; Laurence E. Lynn, Harvard University; Guy Orcutt, Yale University; Michael E. Reagan, University of California at Riverside; George Tanham, Washington Rand Corp.; and Robin M. Williams, Jr., Cornell University.

II. THE ORIGIN AND EVOLUTION OF NSF RESPONSIBILITIES FOR PSYCHOLOGICAL AND SOCIAL SCIENCES

In order to give some perspective to NSF's current programs for psychological and social sciences, it is necessary to discuss some of the factors which shaped the historical thrust and evolution of support for these disciplines in the Foundation. This section describes the origin and evolution of NSF organization and support for the psychological and social sciences disciplines. The initial congressional skepticisms about including support for the social sciences in the NSF charter was gradually modified toward congressional acceptance of the Foundation's responsibilities in this area; this led to adoption of a legislative mandate giving the Foundation responsibilities for applied research and social research, and culminated in the NSF's establishment of the Research Applications Directorate, which manages the Research Applied to National Needs programs (RANN). Recent organizational changes in both basic research support programs and in the RANN program are described.

A. CONGRESSIONAL SKEPTICISM ABOUT INCLUDING THE SOCIAL SCIENCES IN THE NATIONAL SCIENCE FOUNDATON: 1950–1960

When President Harry S. Truman proposed creation of a science foundation in 1945, he recommended explicitly that the social sciences be included among its support activities. However, the act creating the National Science Foundation, passed in 1950, did not include the social sciences among the fields of science which the NSF was directed to support. The NSF enabling legislation directed that these sciences should be encompassed under the Foundation's "permissive mandate" for funding "other sciences." The agency would be permitted to enlarge support for the social sciences when further study established a need for such funding.

In a comprehensive assessment of the legislative rationale surrounding this decision, Franklin P. Huddle noted two bases for rejecting explicit inclusion of the social sciences. First, the witnesses who testified on the bill generally were lukewarm or negative toward including the social sciences.[41] A summary of points opposing the proposed Foundation's responsibility for supporting social and behavioral research included the following:

1. Social science research encounters problems of objectivity (its findings may be exploited for political purposes, or used to influence legislation).

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[41] "Summary [of Technical Information for Congress]." In U.S. Congress. House. Committee on Science and Astronautics. Subcommittee on Science, Research, and Development. Technical Information for Congress. Report . . . prepared by the Science Policy Research Division. Congressional Research Service. Library of Congress. Apr. 26, 1969, revised Apr. 15, 1971. 92d Congress, 1st sess. Washington, U.S. Government Printing Office, Apr. 15, 1971, p. 487. (Committee print) (Prepared by Franklin P. Huddle and others.)

2. Social science methods, approaches, and training of practitioners differ from those in the physical sciences.
3. Findings of social science cannot usually be subjected to experimental verification.
4. The scope of social sciences is limitless and administratively infeasible to encompass in a single agency.
5. Social science is inherently controversial, and would discredit and jeopardize support for the physical sciences.
6. Social sciences are not sciences in the same sense that the physical sciences are.[42]

Second, and probably more important, were congressional reservations about the ill-defined scientific nature of the social sciences:

> Congressional skepticism as to the scientific methodology of the social sciences had much to do with the decision. Testimony by the social scientists had apparently not relieved these uncertainties. The disciplines and the products of the applied social sciences were not clearly distinguished from the routine considerations of the Congress itself. It was not made clear which was "science" and which was merely "commonsense." Physical scientists had more concrete evidence of the potential value of their contributions.[43]

Several factors prompted the Foundation to move cautiously to support these "softer" sciences, to incorporate them into the NSF administrative structure, and to study the need for wider social sciences support. These were Congress' decision in 1950 that NSF be permitted, but not mandated, to support social sciences, and the needs to demonstrate the "scientific" nature of the social sciences, the link between the social and the physical and natural sciences, and the need to fund noncontroversial projects. Dr. Huddle summarized, as follows, the philosophy which appears to have guided NSF's early sponsorship of social science and its attempts to give the social sciences a legitimate home in NSF:

> NSF early resolved the question of the relevance of the disciplines in its program. Selective sponsorship of unmistakably "scientific" social science projects led to the expansion of this phase of NSF activity and probably furthered its eventual formal endorsement by the Congress. Initial congressional reservations also had a salutary effect on the social sciences themselves, resulting in an increase in the rigor of their methodology. Finally, the application of scientific methodologies to social problems in many expanding fields of government activity stimulated the various social science disciplines.[44]

During its first few years, the NSF awarded only a few grants and fellowships (in psychobiology, psychology, and anthropology). For instance, during the fiscal year 1953, eight awards totaling about $100,000 were made in psychobiology. Psychology and anthropology studies were not supported. These programs were funded administratively out of the Division of Biological and Medical Sciences and the Division of Mathematical, Physical, and Engineering Sciences. According to Dr. John T. Wilson, Deputy Director of the Foundation, the early years were characterized by cautious funding and careful study:

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[42] "Inclusion of the Social Sciences in the Scope of the National Science Foundation, 1945–1947: A Groundwork for Future Partnership." In U.S. Congress. House. Committee on Science and Astronautics. Subcommittee on Science, Research, and Development. Technical Information for Congress. Report, prepared by the Science Policy Research Division, Congressional Research Service. Library of Congress. Apr. 25, 1969, revised Apr. 15, 1971. Washington, U.S. Government Printing Office, 1971. pp. 113–114. (Committee print) (Prepared by Franklin P. Huddle and others.)

[43] "Summary [of Technical Information for Congress]," op. cit., pp. 487–488.

[44] "Summary [of Technical Information for Congress]," op. cit., p. 488.

> **Two or three years after the Foundation started its program . . . we began thinking about how to handle the problem of the social sciences. The initial attachment of psychology was in the biological-sciences, medical sciences domain, where it fits very closely to physiology, neurology, and the traditional physiological medical areas of psychology.[45]**

A sociologist was attached during this period to NSF's office of program analysis. His principal function, according to Dr. Wilson, was to assist the Foundation in interpreting social sciences funding data reported by the Census Bureau for incorporation in NSF's annual reports on Federal funds for research. He was also assigned part-time to the Division of Biological Sciences and, according to Dr. Wilson, "We began supporting physical anthropology, cultural anthropology, archaeology, and areas of social sciences that impinged rather closely on the biological sciences." [46]

In March of 1953, the Foundation undertook a study of the "sciences of human social behavior" to help determine its position for increasing support of these areas. The conclusion, endorsed by the National Science Board and published in the Foundation's Fifth Annual Report, in 1955, was that the NSF should support a "limited program of support of the social sciences." However, programs had to meet four criteria:

> **The criterion of science, that is, the identification within the social disciplines, of those areas characterized by the application of the methods and logic of science;**
>
> **The criterion of national interest, namely, the assignment of highest priority to social science activities directly related to the responsibilities of the Federal Government with respect to national welfare and national defense;**
>
> **The criterion of convergence of the natural sciences and the social sciences; and**
>
> **The criterion of basic research.[47]**

B. CREATION OF THE DIVISION OF SOCIAL SCIENCES: 1960

Shortly thereafter, the Foundation began to support a small program of social science research relating to "sociophysical sciences," and the history and philosophy of science, administered by the Physical Sciences Division.[48] Biologically oriented psychology studies continued to be funded by the Biology Division. The Foundation created a separate social science research support program in 1956, and in 1959, created an Office of Social Sciences to consolidate administrative support of social psychology, anthropology, economics, sociology and the history and philosophy of science.[49] In 1960, the Office of Social Sciences was renamed the Division of Social Sciences, having the same administrative status as the natural and physical sciences in the Research Directorate. Gradually, and apparently after receiving some pressure from professional social science associations and Members of Congress supporting them,[50] the Foundation began to expand its support responsibilities for some of the more controversial areas of social sciences. Special projects support was added in 1964; doctoral dissertation support in 1965; and geography, political science, and linguistics support in 1966. (See table 3 for a graphic portrayal of this evolution.)

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[45] Quoted in "Inclusion of the Social Sciences in the Scope of the National Science Foundation," op. cit., p. 123.

[46] Idem., p. 123.

[47] Ibid., p. 123.

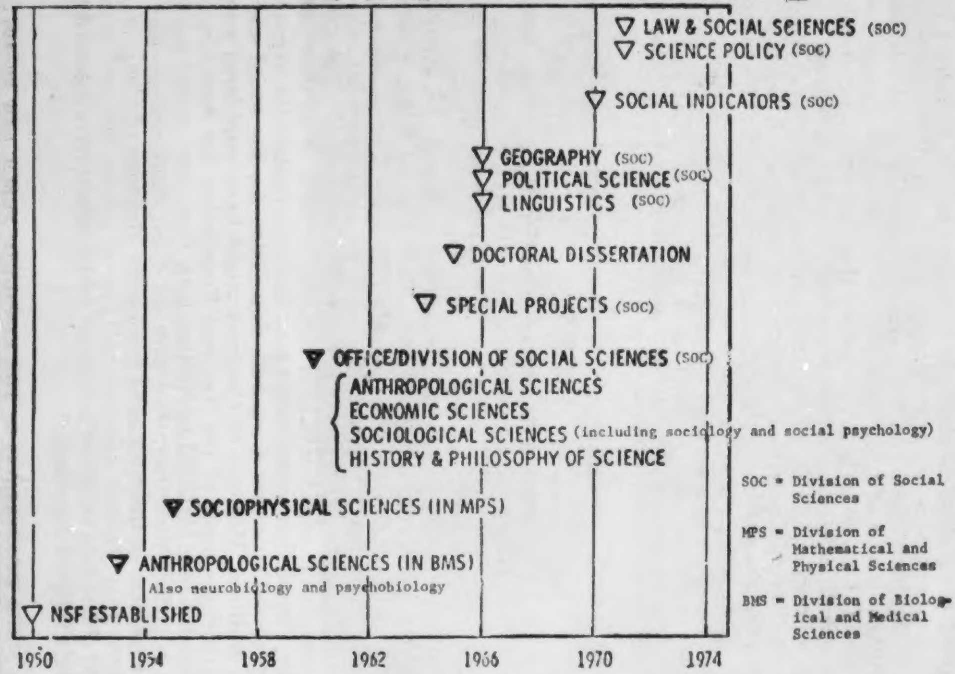
[48] Idem.

[49] Idem.

[50] For a dicussion of some of these activities, see: Carroll, James D. Notes on the Support of Political Science Research Projects by the Division of Social Sciences of the National Science Foundation, fiscal years 1958–65. In U.S. Congress. House. Committee on Government Operations. Subcommittee on Research and Technical Programs. The Use of Social Research in Federal Domestic Programs. (Part IV, Current Issues in the Administration of Federal Social Research.) A staff study. 90th Congress, 1st sess. Washington, U.S. Government Printing Office, 1967, p. 87. (Committee Print).

TABLE 3

National Science Foundation, Psychology and Social Sciences Program Development 1/



1/ Provided by NSF.

C. THE PASSAGE OF PUBLIC LAW 99–407, 1968: EXPANSION OF THE NSF'S MANDATE TO SUPPORT APPLIED RESEARCH AND SOCIAL SCIENCE RESEARCH

The establishment of a Division of Social Sciences in the Foundation and legislative acknowledgment of the propriety of gradual NSF expansion for the support of social science research was demonstrated in the passage of Public Law 90–407, approved on July 18, 1968, which amended the National Science Foundation Act. With respect to the social sciences, this act sanctioned the Division of Social Sciences which had been created in 1960, and included the social sciences explicitly as an area of scientific support within the Foundation's scope. Section 3(c) of the same act instructed the Foundation to support applied scientific research, an action which has had significant import for the Foundation's development of support programs for the social sciences. Summing up congressional sentiments which led to acceptance of the Foundation's role in social sciences, Dr. Huddle wrote:

> The earlier congressional reservations concerning the ability of the social scientists to distinguish between basic and applied research, and their capacity for restraint in the application of social theory, appear to have been removed as a result of the record of NSF performance and judicious selection of research, as well as by the achievements of the social sciences since 1950.[51]

D. THE PROPOSAL TO CREATE A NATIONAL FOUNDATION FOR THE SOCIAL SCIENCES

It should be mentioned that at the same time the NSF amendments were passed, a Senate committee was receiving testimony during 1968 on a proposal introduced by Senator Fred Harris to create a National Foundation for the Social Sciences which would have assumed many of the Foundation's functions in social research, and also would have supported additional social research. The proposal had not been reported out of committee by the time the NSF amendments were passed. The NSF proposal was never debated in terms of an explicit alternative to the proposal to create a National Foundation for the Social Sciences, but it might have been regarded as such. If so, then passage of the Foundation amendments may have diminished the urgency of the proposal to create a separate foundation for the social sciences. In addition, Members of Congress might have considered some of the criticisms made of the National Foundation for Social Sciences proposal. These included opposition both from some social scientists who felt their disciplines had profited from relationships with the other sciences in the NSF, and from some Members of Congress who believed that Federal agencies with social science support missions would object to creation of an agency which might have assumed some of their support functions.[52]

E. FUNDING IMPLICATIONS OF THE PASSAGE OF PUBLIC LAW 90–407: THE TREND TOWARD SUPPORT OF PROBLEM-ORIENTED APPLIED SOCIAL RESEARCH IN RANN

The passage of Public Law 90–407 seems to have had far-reaching effects on the Foundation's internal organization for administering psychological and social sciences research and on trends in priorities for research in these sciences. A picture of the Foundation's complete funding history for the support of basic and applied psychological and social sciences research is given in tables 1 and 2. However, the financial impacts of the passage of Public Law 90–407 can be demonstrated more easily by comparing funding patterns for two fiscal years, 1968, before passage of the amendments, and 1976, estimated. See table 4.

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[51] "Inclusion of the Social Sciences in the Scope of the National Science Foundation," op. cit., p. 125.

[52] For a description of the bill and hearings and actions surrounding it, see: "Congressional Response to Project Camelot." In Technical Information for Congress, op. cit., pp. 145–160. (Prepared by Genevieve J. Knezo.)

TABLE 4.—NSF SUPPORT FOR BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH, FISCAL YEARS 1968 AND 1976

[Dollars in millions]

Fiscal year	Basic research			Applied research	
	Psychology	Social sciences	Psychology	Social sciences, excluding NEC	Social sciences NEC
1968	$7.953	$14.399	0	$1.302	$1.691
1976 (estimate)	6.763	27.615	$1.220	2.695	15.257

A comparison of the funding for these 2 years demonstrates considerable increase primarily for basic research in social sciences and for applied research in the NEC category, which stands for "not elsewhere classified." The NEC reporting category includes primarily research supported under the RANN program, the applied research program created by NSF to fulfill the requirements of Public Law 90–407. (The approximately $15 million for NEC, representing primarily RANN, is the estimate from *Federal Funds*, Vol. 29. Actually the legislatively mandated minimum for 1976 was $19.55 million. See below.)

F. CONGRESSIONAL DIRECTIONS TO INCREASE RANN PROBLEM-ORIENTED SOCIAL RESEARCH AND TO LIMIT BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL RESEARCH: 1975

Recent legislative authorization and appropriations actions, in fact, indicate that the Congress may have set in motion a train of events which might move the NSF toward a course of social science mission support almost diametrically opposite to the original congressional intention that the Foundation support primarily nonproblem oriented basic and applied research in social sciences. In reporting on the fiscal year 1976 NSF appropriations bill, the Senate Appropriations Committee, for the second year in a row, called for a reduction in the scientific research support budget and directed that the Foundation reduce its social science research support activity when adjusting its support program:

> To allow an adequate level of support for scientific research project support programs, the committee recommends an appropriation of $362,000,000 which is $18,000,000 under the budget estimate and $17,000,000 over the House allowance. The committee directs that this reduction in the Foundation request be applied most heavily in the social sciences research project support subactivity.[53]

At the same time both Houses of the Congress, in the conference report on the fiscal year 1976 authorization bill, put a floor (obligation minima) of $23 million on the applied social research and productivity sectors of the RANN program which are the principal RANN program elements to support social research. This floor was $6 million less than total funds NSF requested for its basic and applied social sciences support program (total requested is $28.9 million), and $3 million more than the Foundation requested for the RANN productivity program. Cuts effected by the fiscal year 1976 Appropriations Act lowered the spending floor from $23 million to $19.55 million. The explanation in the conference committee report justifying the increase in the RANN productivity budget notes:

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[53] U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development-independent agencies appropriation bill, 1976. Report to accompany H.R. 8070. July 24, 1975. 94th Cong., 1st sess. Senate Report No. 94–326. Washington, U.S. Government Printing Office, 1975, p. 60.

> Of the total amount authorized under section, category (4), not less than $23,000,000 shall be available for "Applied social research" and for "Policy-sciences research" directed toward increasing the cost-effectiveness of policies and programs dealing with urban and human service problems at the Federal, State, and local government levels. Such funds shall not be available for use with respect to any program or activity if such use would result in a substantial duplication of any program or activity which is receiving other Federal financial assistance. Such funds may be used to identify, analyze, and contribute knowledge to improve productivity in the public sector; identify, analyze, and evaluate more effective, efficient, and equitable ways to deliver human services; and develop the data base and analytical techniques required for improving applied research on municipal systems and human service delivery.[54]

G. ORGANIZATION AND REORGANIZATION OF THE RANN APPLIED SOCIAL RESEARCH PROGRAM

In addition to promoting significant budgetary changes, Public Law 90–407 laid the framework for subsequent short- and long-term reorganization in the Foundation's social science support programs. Before passage of Public Law 90–407, the Foundation was permitted to support primarily only basic research, designed to generate systematic knowledge rather than to solve a particular problem, and only at academic or other nonprofit institutions. The passage of Public Law 90–407 gave the Foundation new authority to support applied research to achieve a particular purpose, and to support research, if necessary at profit-oriented institutions.

In response to the new authority, the Foundation established the Office of Interdisciplinary Research (IRRPOS) in the fiscal year 1970. Its objectives according to the Foundation were:

> First, to provide special encouragement for interdisciplinary research, for which there was judged to be a significant need, but which was difficult to set in motion, especially in universities, and second, to increase the amount and quality of "relevant" research, as the program's title, "Interdisciplinary Research Relevant to Problems of Society . . . proclaimed." [55]

In March of 1971, the Foundation consolidated the problem-oriented research of the IRRPOS program and several related projects from its basic research program—to form the nucleus of RANN (the Research Applied to National Needs program) which was established within the newly created Directorate for Research Applications.[56]

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[54] Sec. 2(a)(9) of conference report on NSF Authorization Act, 1976. U.S. Congress. House. Committee of Conference. National Science Foundation Authorization Act, 1976. Conference report to accompany H.R. 4723, July 30, 1975. 94th Cong., 1st sess., Report No. 94–422. Washington, U.S. Government Printing Office, 1975. p. 2.

[55] Supplied by the Foundation.

[56] U.S. Comptroller General. Opportunities for Improved Management of the Research Applied to National Needs (RANN) program. National Science Foundation, Washington, Nov. 5, 1975. (MWD–75084 and B–133183). p. 1.

According to the Foundation, although RANN continues to support much interdisciplinary research, RANN supported research does not have to be interdisciplinary. The major changes from the IRRPOS program, according to NSF, were intensification of the degree of program management, larger scope and size of program, the prior identification of national needs by NSF through program solicitation announcements, and the close monitoring of the research as it is underway.[57]

The criteria used in the RANN program to determine research priorities are significantly different from those used to fund research in the separate basic and applied disciplinary research directorates. RANN research essentially is directed research, which uses a combined "top down" (that is Foundation solicited), and "bottom up," (that is unsolicited proposal) approach to program management.[58] Most of the basic applied research NSF supports outside of the RANN program is undirected research, which uses a "bottom up" or unsolicited approach to identify program priorities.

Shortly after the RANN program began, its officials, in consultation with advisory groups, established criteria to decide whether a specific societal problem would be addressed by RANN. These include:

> **The *Importance* of the problem to the Nation, the *Payoff* to be realized in relation to anticipated costs of dealing with the problem; the *Leverage* of science and technology, the *Capability* of institutions to mount an effective research effort; the *Need for Federal Action* on the problem; and, the *Role of NSF*.**[59]

The RANN program also has another unique feature, not present in the scientific research support program. This is the requirement that a proposal include a utilization plan,[60] and that the plan be reviewed for adequacy by the Office of Intergovernmental Science and Research Utilization, which is part of the Directorate for Research Applications.[61]

When RANN was first established, it created as one of its four divisions, the Social Systems and Human Resources Division (SSHR), whose principal functions were to support "research concerning the changing structure of society and human resources and for improving . . . social systems." [62] On August 27, 1974, the Foundation reorganized the Research Applications Directorate. The programs supported by the SSHR division and the public sector technology subelements of the advanced technology applications subactivity of the program were combined in the new productivity section. Previous SSHR responsbilities for social data and evaluation apparently are being deemphasized and replaced by new emphases on public policy and the disadvantaged, consumer policy, and social services delivery problems.[63]

The SSHR section has supported the largest share of RANN social research; however, other subelements of the RANN program also support social research, such as energy economics, the economics of natural resources, and the social impacts of natural disasters, etc. It should be underscored that it is extremely difficult to estimate or report RANN social problem oriented research funding. Several different RANN program elements have supported social research; in addition NSF reporting is imprecise due to the use of different definitions of types of research, for instance as between the category NEC (social sciences) in *Federal Funds* and separate accounts. However, the Foundation estimates that a minimum $13 million was allocated to RANN social research during the fiscal year 1975.[64] (See tables 5 and 6 and compare with table 2.)

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[57] Information supplied by NSF.

[58] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 8.

[59] Italics in original. Taken from: Fiscal year 1976 Budget to the Congress, Assistant Director for Research Applications, National Science Foundation, 1975, p. F–5.

[60] Original RANN guidelines specified that the proposal include a section on dissemination of anticipated results. This guideline was changed to read "utilization plan" in May 1974. (Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 124).

[61] Ibid., p. 2.

[62] Ibid., p. 2.

[63] See pages F–7 and F–III–17 of U.S. National Science Foundation, Fiscal year 1976 Budget to the Congress, 1975.

TABLE 5.—NATIONAL SCIENCE FOUNDATION, SOCIAL SCIENCES—FUNDING BY PROGRAM ACTIVITY, FISCAL YEARS 1971-75[1]

	1971	1972	1973	1974	1975
Scientific research project support	$17.7	$22.5	$23.6	$24.3	$26.3
National and special research programs	.1		2.7	2.9	.4
Science information activities	1.2	.5			
Research applied to national needs	5.5	11.3	13.8	14.1	13.0
Energy research			.6	1.5	
Environmental systems			1.3	1.1	
Social systems			9.5	9.7	
Exploratory research and problem assessment			2.4	1.8	
Total, social sciences	24.5	34.3	40.1	41.8	45.9

[1] Supplied by NSF.

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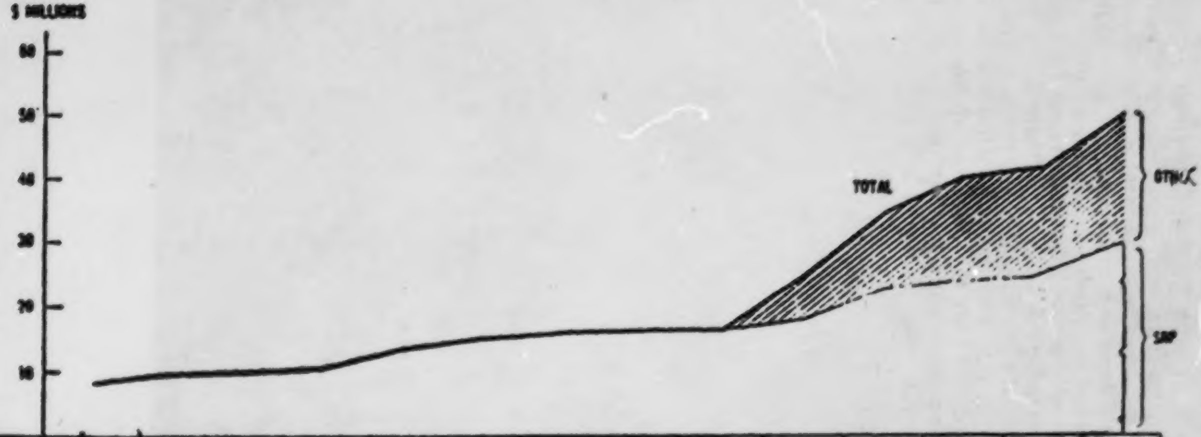
[64] Information supplied by NSF.

Table 6

National Science Foundation, Social Science Research Funding, Division of Social Sciences and Other Programs, Fiscal Years 1962-1975 1/



FY	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
SRP	7.7	9.1	9.9	10.2	13.0	14.7	15.7	15.7	15.7	17.7	22.5	23.6	24.8	26.3
TOTALS										24.5	34.3	40.1	41.8	40.3

SRP _ Scientific Research Project Support

1/ Supplied by NSF.

II. REORGANIZATION OF THE DIVISION OF SOCIAL SCIENCES: 1975

From 1960 until July 10, 1975, NSF organization for the support of basic and applied psychological and social sciences research in the Research Directorate remained relatively stable. The scientific aspects of psychology (neurobiology and psychobiology) were supported by the Division of Biological and Medical Sciences, one of seven separate divisions reporting directly to the Assistant Director for Research. All other social and psychological scientific research project support awards were handled by the Division of Social Sciences, another of the seven divisions reporting to the Assistant Director for Research. Some changes had occurred in the Division of Social Sciences—principally the addition of new support programs: social indicators in 1970; and law and social sciences and science policy in 1971. (See table 7.)

/S/
H.Gaylord Stover,Dir.
Date:February 12, 1974

Table 7

Organization, National Science Foundation, February 1974

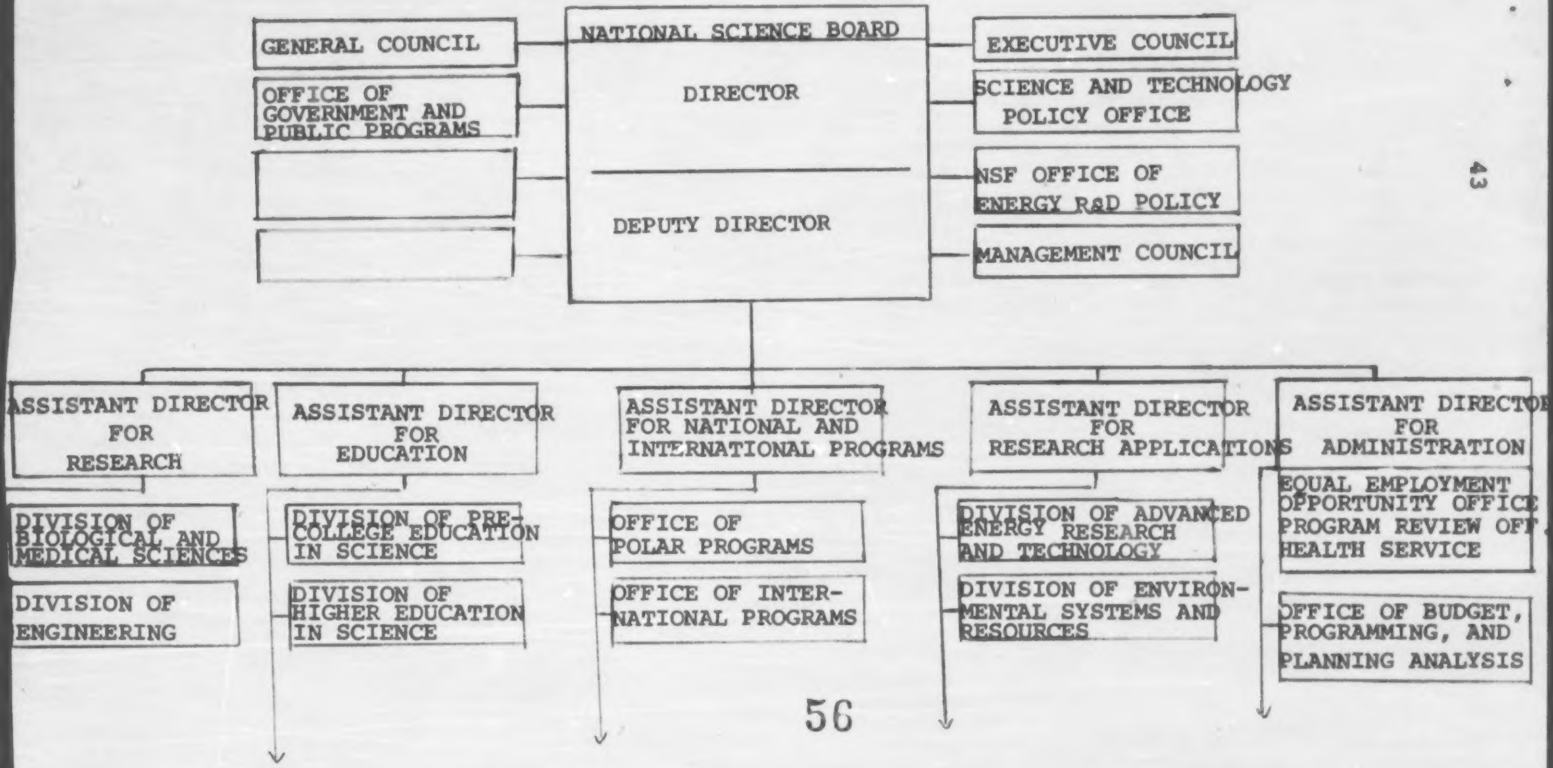
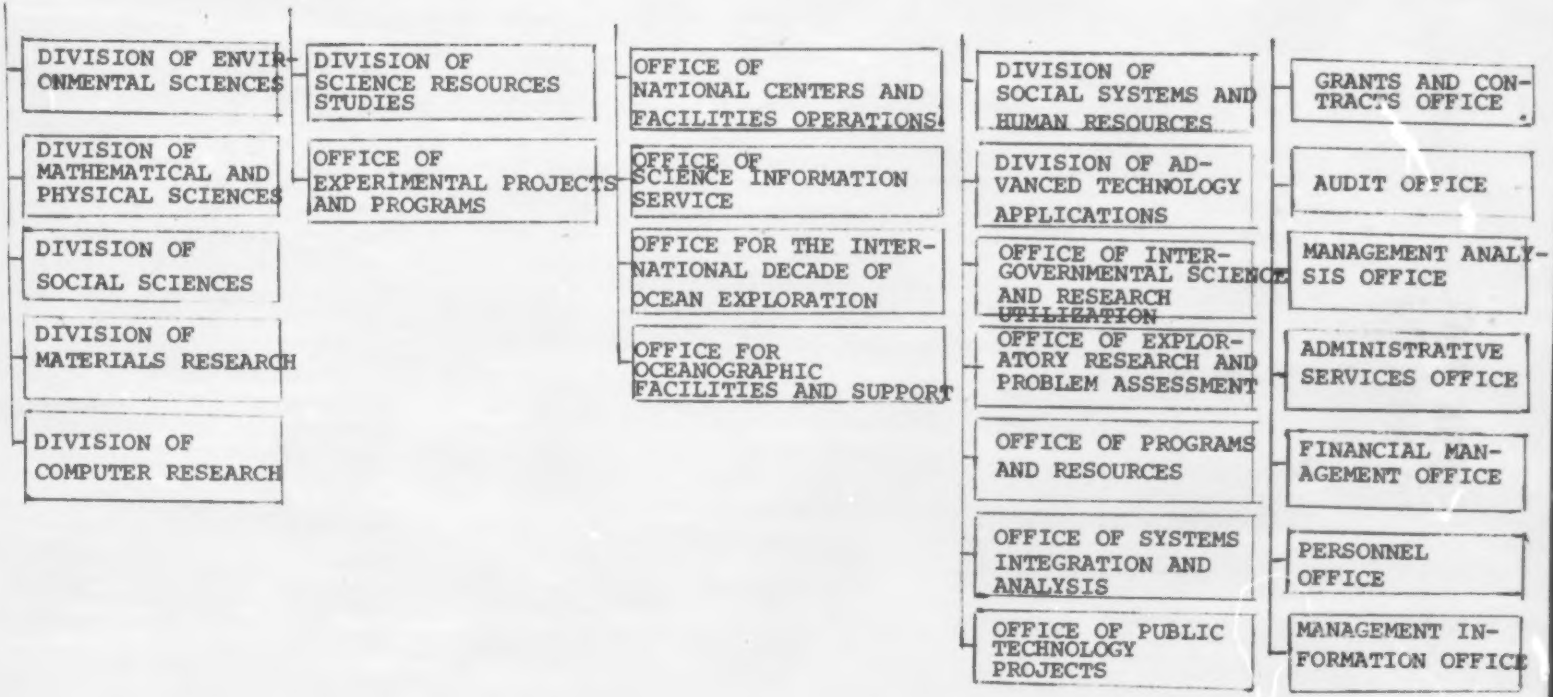

GENERAL COUNCIL
OFFICE OF GOVERNMENT AND PUBLIC PROGRAMS
NATIONAL SCIENCE BOARD
DIRECTOR
DEPUTY DIRECTOR
EXECUTIVE COUNCIL
SCIENCE AND TECHNOLOGY POLICY OFFICE
NSF OFFICE OF ENERGY R&D POLICY
MANAGEMENT COUNCIL
ASSISTANT DIRECTOR FOR RESEARCH
DIVISION OF BIOLOGICAL AND MEDICAL SCIENCES
DIVISION OF ENGINEERING
ASSISTANT DIRECTOR FOR EDUCATION
DIVISION OF PRE-COLLEGE EDUCATION IN SCIENCE
DIVISION OF HIGHER EDUCATION IN SCIENCE
ASSISTANT DIRECTOR FOR NATIONAL AND INTERNATIONAL PROGRAMS
OFFICE OF POLAR PROGRAMS
OFFICE OF INTERNATIONAL PROGRAMS
ASSISTANT DIRECTOR FOR RESEARCH APPLICATIONS
DIVISION OF ADVANCED ENERGY RESEARCH AND TECHNOLOGY
DIVISION OF ENVIRONMENTAL SYSTEMS AND RESOURCES
ASSISTANT DIRECTOR FOR ADMINISTRATION
EQUAL EMPLOYMENT OPPORTUNITY OFFICE
PROGRAM REVIEW OFF.
HEALTH SERVICE
OFFICE OF BUDGET, PROGRAMMING, AND PLANNING ANALYSIS

Table 7 (continued)


DIVISION OF ENVIRONMENTAL SCIENCES
DIVISION OF MATHEMATICAL AND PHYSICAL SCIENCES
DIVISION OF SOCIAL SCIENCES
DIVISION OF MATERIALS RESEARCH
DIVISION OF COMPUTER RESEARCH
DIVISION OF SCIENCE RESOURCES STUDIES
OFFICE OF EXPERIMENTAL PROJECTS AND PROGRAMS
OFFICE OF NATIONAL CENTERS AND FACILITIES OPERATIONS
OFFICE OF SCIENCE INFORMATION SERVICE
OFFICE FOR THE INTERNATIONAL DECADE OF OCEAN EXPLORATION
OFFICE FOR OCEANOGRAPHIC FACILITIES AND SUPPORT
DIVISION OF SOCIAL SYSTEMS AND HUMAN RESOURCES
DIVISION OF ADVANCED TECHNOLOGY APPLICATIONS
OFFICE OF INTERGOVERNMENTAL SCIENCE AND RESEARCH ~~UTILIZATION~~
OFFICE OF EXPLORATORY RESEARCH AND PROBLEM ASSESSMENT
OFFICE OF PROGRAMS AND RESOURCES
OFFICE OF SYSTEMS INTEGRATION AND ANALYSIS
OFFICE OF PUBLIC TECHNOLOGY PROJECTS
GRANTS AND CONTRACTS OFFICE
AUDIT OFFICE
MANAGEMENT ANALYSIS OFFICE
ADMINISTRATIVE SERVICES OFFICE
FINANCIAL MANAGEMENT OFFICE
PERSONNEL OFFICE
MANAGEMENT INFORMATION OFFICE

On July 10, 1975, the Foundation was restructured with major changes occurring in the Research Directorate, which was headed by the Assistant Director for Research. The position of Assistant Director for Research was abolished; and the seven former divisions of the Research Directorate were reorganized into three separate directorates, headed by Assistant Directors who report directly to the Foundation's Deputy Director. Significant changes occurred in the organization of psychological and social sciences. A new directorate, the Directorate for Biological, Behavioral, and Social Sciences, was created. It encompasses four separate divisions. Psychology and social sciences support are handled respectively by the Division of Behavioral and Neural Sciences and the Division of Social Sciences. One of the principal effects of the reorganization was the transfer to the Division of Behavioral and Neural Sciences of some of the programs which previously had been administered by the Division of Social Sciences. Transferred out of the former Division of Social Sciences were social psychology, anthropology, and linguistics. These three programs and the neurobiology and psychobiology programs of the former Division of Biological and Medical Sciences constitute the new "behavioral sciences" programmatic responsibilities of the Division of Behavioral and Neural Sciences.

The remaining programs of the former Division of Social Sciences constitute the new responsibilities of the Division of Social Sciences. They are encompassed under two sections: economics and quantitative methods, and sociological and political sciences. (See table 8.)

Table 8

Organization of the Directorate for Biological, Behavioral and Social Sciences, November 1975

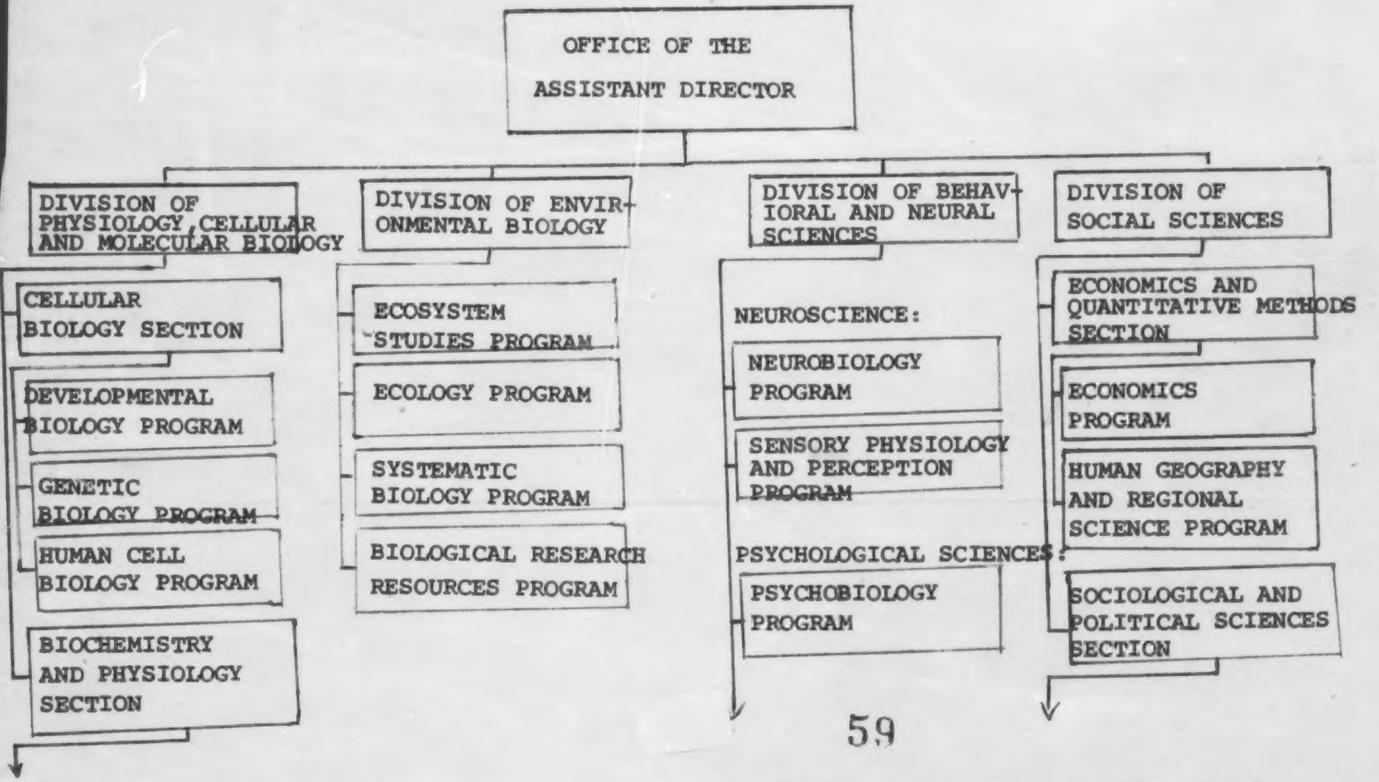
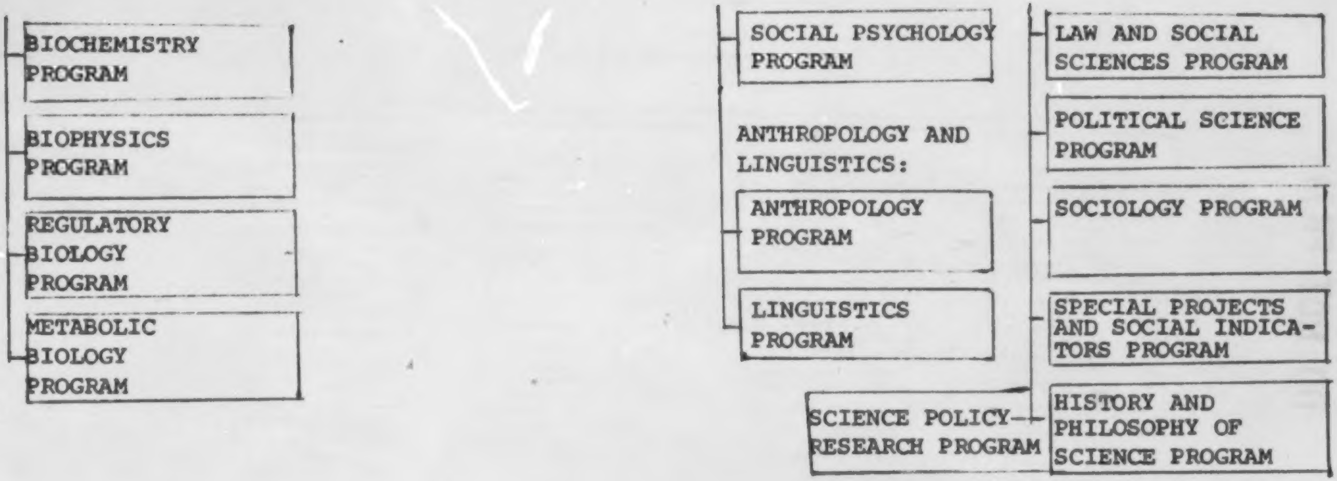

OFFICE OF THE ASSISTANT DIRECTOR
DIVISION OF PHYSIOLOGY, CELLULAR AND MOLECULAR BIOLOGY
CELLULAR BIOLOGY SECTION
DEVELOPMENTAL BIOLOGY PROGRAM
GENETIC BIOLOGY PROGRAM
HUMAN CELL BIOLOGY PROGRAM
BIOCHEMISTRY AND PHYSIOLOGY SECTION
DIVISION OF ENVIRONMENTAL BIOLOGY
ECOSYSTEM STUDIES PROGRAM
ECOLOGY PROGRAM
SYSTEMATIC BIOLOGY PROGRAM
BIOLOGICAL RESEARCH RESOURCES PROGRAM
DIVISION OF BEHAVIORAL AND NEURAL SCIENCES
NEUROSCIENCE:
NEUROBIOLOGY PROGRAM
SENSORY PHYSIOLOGY AND PERCEPTION PROGRAM
PSYCHOLOGICAL SCIENCES:
PSYCHOBIOLOGY PROGRAM
DIVISION OF SOCIAL SCIENCES
ECONOMICS AND QUANTITATIVE METHODS SECTION
ECONOMICS PROGRAM
HUMAN GEOGRAPHY AND REGIONAL SCIENCE PROGRAM
SOCIOLOGICAL AND POLITICAL SCIENCES SECTION

Table 8 (continued)


BIOCHEMISTRY PROGRAM
BIOPHYSICS PROGRAM
REGULATORY BIOLOGY PROGRAM
METABOLIC BIOLOGY PROGRAM
SOCIAL PSYCHOLOGY PROGRAM
ANTHROPOLOGY AND LINGUISTICS:
ANTHROPOLOGY PROGRAM
LINGUISTICS PROGRAM
SCIENCE POLICY RESEARCH PROGRAM
LAW AND SOCIAL SCIENCES PROGRAM
POLITICAL SCIENCE PROGRAM
SOCIOLOGY PROGRAM
SPECIAL PROJECTS AND SOCIAL INDICATORS PROGRAM
HISTORY AND PHILOSOPHY OF SCIENCE PROGRAM

According to some news reports on the reorganization, the consolidation of all basic and applied scientific research project support for psychological and social sciences into a separate directorate elevates the status and visibility of the social sciences. Several explanations have been offered to support this assertion. First, the Foundation's new Deputy Director, now Acting Director, Richard Atkinson, named in February 1975, is a psychologist.[65] Second, the social sciences will profit from the potentially larger number of senior personnel available to develop and guide programs.[66]

However, such optimism may be premature. A biologist, Dr. Eloise E. Clark, rather than a behavioral scientist, was named the first head of the Directorate—Acting Assistant Director of the Directorate for Biological, Behavioral, and Social Sciences.[67] Second, the transfer of social psychology, anthropology and linguistics from the Division of Social Sciences to the Division of Behavioral and Neural Sciences may indicate that more attention will be given to the biological, rather than to the more ill-defined behavioral or social basis of behavior.[68]

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[65] A Psychologist Moves to No. 2 Job at NSF. Science and Government Report, May 15, 1975: 4–6. Psychologist Picked for NSF. Behavior Today, Mar. 17, 1975: 417–418. (Subsequently Dr. Atkinson became NSF Director.)

[66] NSF Reorganization Elevates Social Sciences. Science and Government Report, Aug. 1, 1975: 6–7.

[67] National Science Foundation. Memo to science writers and editors. Reorganization of the Directorate for Biological, Behavioral and Social Sciences. Oct. 8, 1975: 2. Subsequently Dr. Clark was named Assistant Director.

[68] The Congress has not yet completed action on the fiscal year 1977 NSF budget authorization. However, some indication of the implications of the reorganization of the Directorate for Biological, Behavioral, and Social Sciences are revealed in NSF"s budget request. The Foundation is asking for a 23-percent increase in the behavioral and neural sciences program subactivity. The largest increases are for the following disciplines: neurobiology, psychobiology, and sensory physiology and perception. The fiscal year 1977 budget request for the social sciences subactivity is 18 percent larger than the fiscal year 1976 request. The largest increase is for the line item category: "economic's, human geography and regional science." (U.S. National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, fiscal year 1977. (pp. D–II–1 and IV–1.))

III. NATIONAL SCIENCE FOUNDATION BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL SCIENCES SCIENTIFIC RESEARCH PROJECT SUPPORT PROGRAMS

NSF supported research in the psychological and social sciences seems to have generated results of considerable merit. (For illustrations, see the appendix.) However, it seems reasonable to assume that the Division of Social Sciences, long the principal supporting section for such research, has reached a critical juncture in its development. The recent reorganization and the transfer of some of the Division's former responsibilities undoubtedly contribute to the current environment. The Division's research support programs also face the scrutiny and criticisms being levied at most federally supported social science research, as described in section I. Other factors impacting on the Division are the recent congressional criticism of certain NSF research support projects, Senate Appropriations Committee instituted budget cuts, and growth of the Research Applied to National Needs (RANN) program.[69]

This section deals with those issues of funding, management, and priorities that seem to have major implications for congressional oversight of the Division of Social Sciences and for its former responsibilities for anthropology, linguistics, and social psychology, which now are handled by the Division of Behavioral and Neural Sciences. Among the issues that will be treated are: The importance of the Foundation's role in supporting academic research coupled with the retrenchment in funding for support of such research; criticisms of the Foundation's psychology and social sciences research support programs; an apparent concentration of research awards and attempts to measure the productivity of principal grantees; proposal review and the apparent absence of advisory groups for major areas of science supported; the identification of priorities for research support and issues surrounding their documentation and analysis by Foundation officials; the significance of continuing grants, and the issues of improving the enumeration, analysis and reporting of continuing grants to aid in congressional oversight and to assist the Foundation in developing its support programs; issues in determining a balance of support in basic research between "scientifically rigorous" and other types of social science research; coordination of the Foundation's social research support programs, both internally and in relation to other agencies; and issues surrounding NSF's role as a primary Federal supporter of basic, applied, and problem-oriented psychological and social research.

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[69] National Science Foundation Authorization Act, 1976. Conference report to accompany H.R. 4723, op. cit., p. 2.

Since its inception, RANN has supported a considerable fraction of the Foundation's applied problem-oriented social research program, generally averaging at a minimum about $13 to $14 million for the last few fiscal years. The Congress recently instructed RANN to increase to $23 million its coverage for applied problem-oriented social research and policy research for the fiscal year 1976.

A. NSF'S ROLE AS A PRIMARY FEDERAL SUPPORTER OF ACADEMIC RESEARCH ESPECIALLY IN THE SOCIAL SCIENCES

Most of the basic psychological and social sciences research supported by NSF has been handled by the Division of Social Sciences, and by the Division of Biological and Medical Sciences for the more biologically-oriented psychological sciences, that is psychobiology and neurobiology.[70] (With the recent reorganization, these subjects are handled by the Divisions of Social Sciences and Behavioral and Neural Sciences.) Several important characteristics of NSF funding to academic psychological and social sciences researchers are revealed in the data arrayed in table 9. The bulk of the Foundation's, and undoubtedly the Division's, awards for basic and applied research in psychology is for research performed in universities and colleges. Over 50 percent of funds awarded in the fiscal years 1973, 1974 and 1975 for both biological and social aspects of psychology went to academic institutions.

The Foundation plays a smaller role than other Federal agencies, notably the Department of Health, Education, and Welfare, especially the National Institute of Mental Health in supporting psychological research in universities and colleges. However, as the data arrayed in table 9 indicate, the bulk of NSF supported basic and applied research in the psychological sciences is performed by researchers in universities and colleges.

With respect to support for the social sciences, the data indicate also that the bulk of the Foundation's support for basic and applied research in the social sciences is performed in universities. More important perhaps, the Foundation is the principal Federal support agency for the bulk of federally funded academic research in social science disciplines. For instance, the data in table 9 indicate that during the fiscal years 1973, 1974, and 1975, the Foundation and undoubtedly the Division of Social Sciences, provided at least half of all Federal funds received by universities and colleges for the support of basic and applied research in history and political science. NSF support for anthropology and linguistics for these years averages close to the same. (See table 9.)

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[70] Although RANN program officials report that they have the authority to support some basic research, RANN probably supports a very small amount of nonproblem oriented basic and applied social and behavioral research.

TABLE 9.—SUPPORT OF PSYCHOLOGY AND SOCIAL SCIENCES RESEARCH AT UNIVERSITIES AND COLLEGES, NATIONAL SCIENCE FOUNDATION AS A PERCENT OF FEDERAL SUPPORT, AND AS A PERCENT OF NATIONAL SCIENCE FOUNDATION SUPPORT, FISCAL YEARS 1973, 1974, AND 1975 [1]

	Psychology			Social sciences							
	Total	Biological aspects	Social aspects	Total	Anthropology	Economics	History	Linguistics	Political science	Sociology	N.E.C.
Fiscal year 1973, NSF supported basic and applied research in universities as a percent of total federally supported basic and applied research in universities in the field of	23	34	11	31	72	21	97	46	90	10	41
Fiscal year 1973, NSF supported research as a percent or total NSF supported basic and applied research in universities in the field of	94	94	95	78	89	73	99	100	93	79	77
Fiscal year 1974, NSF supported basic and applied research in universities as a percent of total federally supported basic and applied research in universities in the field of	10	13	8	31	54	20	85	49	71	9	44
Fiscal year 1974, NSF supported research in universities as a percent of total NSF supported basic and applied research in the field of	94	94	94	80	93	94	92	[2] 100+	[2] 100+	74	69
Fiscal year 1974, NSF supported basic research in universities as a percent of total NSF supported basic research in the field of	94	94	94	85	92	94	92	92	94	94	70
Fiscal year 1975, NSF supported basic and applied research in universities as a percent of total federally supported basic and applied research in universities in the field of	15	22	8.5	33	41	22	63	62	59	20	39
Fiscal year 1975, NSF supported research in universities as a percent of total NSF supported basic and applied research in the field of	68	66	76	56	76	75	96	77	74	74	42
Fiscal year 1975, NSF supported basic research in universities as a percent of total NSF supported basic research in the field of	67	65	75	64	76	74	95	76	71	72	52

[1] Computed from data in NSF's series, Federal Funds . . ., vols. 23, 24, and 25.

[2] Data reported are inaccurate,

B. HISTORICAL TRENDS IN NSF'S FUNDING FOR PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH

As an agency with major responsibilities for supporting basic and applied research in the social sciences, whose role could have been expected to be enlarged as a result of the Mansfield amendment,[71] it could be speculated that the NSF should have had well-formulated plans and procedures for supporting these disciplines, for insuring that Federal funds are used to best advantage, and for supporting the most promising areas of research in order to hasten the development of the social sciences disciplines.

Several funding trends must be considered in assessing the Foundation's performance on these measures. Undoubtedly most important, the Division has been operating under considerable financial constraints. These are revealed by several different types of data.

1. *The trend toward diminishing resources to support basic and applied research.*—Tables 10, 11, and 12 give data on historical trends in the programmatic funding of the Division of Social Sciences. The data indicate that the Division's support for many social sciences disciplines either has remained stable in terms of dollar obligations, or has diminished as a percentage of total Division funding. These trends are evident especially in table 10 which compares funding data by discipline for the fiscal years 1970 and 1975. This table shows, for example, that during the fiscal year 1970, political science received 1.20 million dollars, or 7.5 percent of the Division's budget; during the fiscal year 1975, 5 years later, political science received $1.55 million or 6 percent of the Division's budget. Other program areas whose absolute amount of funding has remained about the same for the two fiscal years are anthropology, geography, sociology, and social psychology, and the history and philosophy of science.

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[71] During the fiscal year 1970 budget hearings on the Department of Defense, Congress attached an amendment to the procurement bill which stipulated that: "None of the funds authorized to be appropriated by this Act may be used to carry out any research project or study unless such project or study has a direct and apparent relationship to a specified military function or operation."[a] Carroll notes that "Singled out for elimination or reduction were basic research projects of all fields of science, and all behavioral and social sciences research, research projects largely conducted by university-based scholars." The scholarly community subsequently initiated a campaign to eliminate the provision. "Although the amendment was substantially weakened in 1970, some $100,000,000 in planned university research was either cancelled or shifted to the NSF, including some $14,000,000 in social science research. Only two of the deleted social research projects, totalling $92,000 in expenditures, were ultimately funded by the NSF. The net effect of the "Mansfield" amendment was to temporarily dampen gross expenditures for research and development for fiscal years 1970 to 1972, and to shift social scientific research functions to the NSF and social-welfare agencies."[b]

"[a] For the Senate debate see: Congressional Record, vol. 115, Aug. 12, 1969, pp. 23460–25485 and 23502–23507.

"[b] Carroll, James D. and Charles R. Knerr. Changes in Federal Support for Political Science Research. Paper prepared for the American Political Science Association annual meeting, 1975, San Francisco, pp. 7–9."

TABLE 10.—PROGRAM BUDGETS, SOCIAL SCIENCES DIVISION, NATIONAL SCIENCE FOUNDATION, INCLUDING PERCENTS OF FUNDS AWARDED FOR SUBJECT DISCIPLINES, FISCAL YEARS 1970 and 1975

[In millions of dollars] [1]

Program	Fiscal year 1970		Fiscal year 1975	
	Dollars	Percent of division funds	Dollars	Percent of division funds
Anthropology	3.57	22.0	4.00	16.0
Economics	4.64	28.0	7.26	29.0
Geography	.51	3.0	.49	2.0
Sociology	3.54	22.0	2.78	10.7
Social psychology			2.20	9.0
Political science	1.20	7.5	1.55	6.0
History and philosophy of science	.87	5.0	.93	3.6
Special projects (including linguistics)	1.76	11.0	3.48	14.0
Social indicators [2]			1.67	6.0
Law [2]			.91	3.5
Science Policy [2]			.49	2.0
Total	15.99		25.71	

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[1] Computed from data supplied by NSF, table 12, below.

[2] These fields were not reported as separate program areas in 1970.

TABLE 11.—PSYCHOLOGY, SOCIAL SCIENCES AND RANN SOCIAL SCIENCES EXPENDITURES IN RELATION TO TOTAL NATIONAL SCIENCE FOUNDATION EXPENDITURES FOR RESEARCH FISCAL YEARS 1966–76

[Dollar amounts in millions]

	1966	1967	1968	1969	1970	1971	1972	1973	1974	[1] 1975	[1] 1976
Total NSF research [2]	$224	$241	$257	$258	$275	$318	$427	$464	$520	$591	$652
Total psychology and social sciences research in NSF [3]	$21	$24	$25	$26	$27	$36	$47.8	$48	$42	$49	$54
Total psychology and social sciences research in NSF as a percent of total NSF research [5]	9	10	10	10	10	11	11	10	8	9	8
RANN and other NSF problem-oriented psychological and social research [4]						$6.8	$11.8	$16.5	$17	$13.4	[6] $23
Total psychology and social sciences research in NSF, excluding RANN and other problem-oriented social research, as a percent of total NSF research support [5]						8	8	7	5	6	5

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[1] Estimated.

[2] U.S. National Science Foundation. Federal Funds for Research, Development, and Other Scientific Activities, fiscal years 1974, 1975, and 1976, vol. 24. NSF 75-323. Washington, U.S. Government Printing Office, 1975. p. 149, and other volumes.

[3] Extrapolated from data taken from source in footnote 2.

[4] Data supplied by NSF, see table. There are inconsistencies in data reported by NSF since different reporting categories are used by different sections. Only the data for RANN and other nonscientific research project support categories were used to obtain these figures. (See tables 5 and 6.)

[5] Computed using data from footnote sources 2 and 4.

[6] This is the obligation minima established by the Congress only for RANN for the NSF fiscal year 1976 appropriations bill. The application of the "proportionality by reduction" reduced the amount to $19.5 million.

Table 12

Program Budget, Social Sciences Division, National Science Foundation, Fiscal Years 1966–75 [1]

(In Millions of Dollars)

	Fiscal Year									
Program	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Anthropology	3.98	3.66	3.61	3.62	3.57	3.56	3.85	4.16	4.01	4.00
Economics	2.35	3.21	3.69	4.44	4.54	4.83	5.31	5.56	5.95	7.25
Geography	.22	.41	.60	.19	.51	.65	1.00	.79	[illegible]	[illegible]
Sociology	3.66	4.06	4.04	3.56	3.54	4.15	2.37	2.40	2.42	[illegible]
Social Psychology							2.14	2.45	2.23	2.20
Political Science	.34	.80	.79	1.31	1.20	1.39	1.50	1.63	1.55	1.55
History & Philosophy of Science	1.02	.81	.83	.83	.87	.79	.87	.89	.94	.93
Special Projects (Including Linguistics)	1.03	1.96	1.86	1.97	1.76	2.58	2.83	3.13	3.76	3.48
Social Indicators							2.05	1.72	1.50	1.67
Law							.90	1.09	1.05	.91
Science Policy							.75	.39	.40	[illegible]
	12.59	14.91	15.41	15.92	15.99	18.00	23.58	24.24	24.37	25.71

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[1] Supplied by NSF.

Another important trend is that NSF expenditures for psychological and social sciences research as a percent of total research funds awarded by NSF have decreased slightly since 1966. For instance, as the data in table 11 indicate. in fiscal year 1966, the Foundation's support of these two science areas constituted 9 percent of the Foundation's total budget. During the late 1960's and early 1970's, the percentage awarded for psychological and social sciences increased somewhat, averaging about 10 to 11 percent. During the period 1974 to 1976, expenditures for these sciences as a total percent of NSF's support for all science began to decrease. Also as the table demonstrates, NSF obligations for total basic and applied social and psychological research, excluding the RANN program and other NSF expenditures for these areas, demonstrated even more of a downward shift, for example, from 10 percent in the fiscal year 1970, to an estimated 5 percent in the fiscal year 1976.

2. *The inverse relationship between NSF support patterns and the growth in the number of researchers.*—These funding trends alone would seem to raise some important questions about the availability and allocation of resources for basic and applied behavioral and social research. However, the retrenchment in funding for these areas of science is demonstrated even more vividly by comparing NSF funding trends to trends in the increasing number of Ph. D. level professionals employed in universities and colleges who must compete for these research funds.

In 1965, 42,283 psychologists and social scientists were employed in American academic institutions, and in 1975, 86,381, over twice the number employed in 1965. (See table 13.) Therefore while the number of scientists who might potentially do psychological and social sciences research has doubled,[72] NSF expenditures for research in these areas have remained stable or have diminished in relation to total NSF expenditures for all fields of scientific research. When evaluated in terms of dollar expenditures, NSF support for these sciences has increased about one-third in terms of current dollars. Expressed in constant dollar terms however, these expenditures decreased by about 15 percent during the period 1966 to 1976, estimated.

TABLE 13.—NUMBER OF SCIENTISTS AND ENGINEERS EMPLOYED IN UNIVERSITIES AND COLLEGES, PSYCHOLOGY AND SOCIAL SCIENCES, BY DISCIPLINE, 1965–75[1]

Field of employment	January						
	1965	1967	1969	1971	1973	1974	1975
Total	178,094	212,855	246,183	273,775	281,516	286,098	297,193
Psychologists	9,430	11,358	14,780	16,806	18,881	19,966	21,727
Social scientists	32,853	39,767	52,617	59,094	60,509	61,443	64,654
Economists	7,932	9,662	10,402	11,263	11,378	12,041	12,713
Sociologists	6,261	7,558	9,451	11,323	12,485	13,011	14,203
Political scientists	5,919	7,190	7,919	8,938	9,705	10,010	10,605
Historians	NA	NA	14,427	15,871	16,289	15,896	15,758
Other social scientists	12,741	15,357	10,418	11,679	10,652	10,485	11,375

[1] U.S. National Science Foundation. Manpower Resources for Scientific Activities at Universities and Colleges, January 1975. Detailed statistical tables, appendix B. Washington, U.S. Government Printing Office, 1975. Table B-1, p. 1.

C. CRITICISMS OF FOUNDATION SUPPORTED RESEARCH IN PSYCHOLOGICAL AND SOCIAL SCIENCES

Considerable recent criticism has been directed at the Foundation's support of some basic and applied psychological and social sciences research. Senator William Proxmire, chairman of the Senate Appropriations Subcommittee dealing with NSF, has reasoned that some projects might be supported more appropriately by other agencies, some merely demonstrate common sense knowledge and do not require study for further verification, others are not scientific, and some do not merit funding when compared against other more important priority projects for scarce Federal research dollars. For instance, in reporting on the Foundation's fiscal year 1976 budget, the Senate Appropriations Committee noted:

> The Committee continues to be concerned over the Foundation's tendency to fund what seems to be low-priority research in the social sciences, and, equally important, its failure to be more responsive in explaining its program to the average American taxpayer.[73]

During fiscal year 1976 hearings on the budget, Senator Proxmire criticized NSF social research projects dealing with trends in tolerance of nonconformity,[74] dependency and interpersonal attraction,[75] and a number of anthropology and linguistics studies, dealing for example with Mayan grammar and dictionaries, and grammar of Eskimos.[76]

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[72] One should not assume that all social and psychological scientists employed in universities do research. However, it is valid to assume that the percent of those who do research has remained at least stable, indicating that the absolute number of those who do research would have doubled since 1965.

[73] Department of Housing and Urban Development-Independent Agencies Appropriation Bill, 1976, report, op. cit., p. 59.

[74] U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development and Certain Independent Agencies Appropriations, Fiscal Year 1976. Hearings, 94th Cong., 1st sess., Washington, U.S. Government Printing Office, 1975. p. 54.

[75] Ibid., p. 55.

1. *The Origin and Evolution of Congressional Criticisms of NSF's Support for Basic and Applied Psychological and Social Research.*—Congressional criticisms of the Foundation's support of social and behavioral sciences did not begin in 1975 or with Senator Proxmire, as evidenced by initial congressional rejection in 1950, and then gradual acceptance of these sciences as legitimate areas of scientific inquiry appropriate for Foundation support. Although the Congress gave the Foundation a statutory mandate in 1968 to support social sciences and applied social sciences, considerable congressional skepticism has continued to accompany consideration of the Foundation's support program for these sciences. One of the most recurrent criticisms is that the NSF supports projects which absorb needless expenditures of taxpayers' dollars for studies whose answers may be ascertained with mere common sense. For instance, the following exchange occurred in the 1970 House hearings on the NSF appropriations bill:

> Mr. [JOE] EVINS. Doctor, how many grants were made in the social science field last year?
>
> Dr. [HOWARD] HINES. 474.
>
> Mr. EVINS. How many do you estimate for the next year?
>
> Dr. HINES. I suspect it will be about the same number.
>
> Mr. EVINS. What was the largest grant?
>
> Dr. HINES. There were a few, about $250,000.
>
> Mr. EVINS. To whom and what for?
>
> Dr. HINES. One was a study on the attitude of the American people toward violence.
>
> Mr. EVINS. I can tell you the attitude, they don't like it. Who was this grant made to?
>
> Dr. HINES. The University of Michigan.
>
> Mr. EVINS. Are they still underway with their study?
>
> Dr. HINES. Yes, sir.
>
> Mr. EVANS. They haven't come up with the answer yet?[77]

Also, much of the current criticism has focused on NSF's support of research that appears wasteful to some observers. For example, Senator Proxmire noted the following about a project supported by the Division of Social Sciences:

> Principal Investigator Dr. Clyde Z. Nunn, wrote as a letter in response to my criticisms of his particular project entitled "Trends in Tolerance of Nonconformity" ($350,000). After 5 pages of explanation, Dr. Nunr revealed to me that the principal finding of his study has been that 48 percent of the American people believe in the Devil.
>
> Perhaps William Blatty, author of "The Exorcist," finds this interesting, but I doubt if the factory worker in Oshkosh making $7,200 per year or the farmer in Louisiana making even less finds this expenditure of his tax dollars particularly beneficial.[78]

Critics also contend that social science really isn't science. For instance:

> Senator PROXMIRE. Well, here's my problem. It just seems the resources are limited and you have your budget reduced.
>
> Under these circumstances, to proceed in these areas that have very little if any scientific relationship—American federalism is something that you might

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[76] Ibid., p. 58.

[77] U.S. Congress. House. Committee on Appropriations. Subcommittee on Independent Offices and Department of Housing and Urban Development. Independent Offices and Department of Housing and Urban Development Appropriations for 1971, part 2. Hearings, 91st Cong., 2d sess. Washington, U.S. Government Printing Office, 1970, p. 699.

[78] Press Release, Office of Senator William Proxmire, Mar. 2, 1975, p. 2.

have political scientists, political "scientists" make valuable contributions on and you might have former mayors or Governors or Congressmen or what not who have some useful opinions on it, and I have great admiration and recognize the great contributions scientists make, but it seems to me this is out of your field.

Dr. STEVER. The National Science Foundation has a specific assignment in the field of social sciences, and it does include political science in the basic research area. This is part of our charter under the NSF Act of 1950, as amended.

Dr. CREUTZ. $25 million is included in the fiscal year 1974 request for basic research support in the social sciences.

Senator PROXMIRE. You spend $25 million in the social sciences?

Dr. STEVER. Yes, sir, in the scientific research project support activity.

Senator PROXMIRE. I have trouble with semantics. They shouldn't have called it social science. They should have called it something else, and then you could have saved $25 million.[79]

A February 1975 internal NSF report on the management of the social sciences faulted the Division of Social Sciences for not properly determining and articulating its priorities. The report recommended, in fact, that better attempts be made to identify the expected social utility of social research projects, that projects be clustered both in consideration for funding and in reporting so that data could be generated about cumulative advances in a discipline, and that the Foundation consider using some of the RANN criteria, especially those relating to policy relevance and utility in awarding grants for research supported by the division of social sciences. The report was not made public because no consensus was reached on these issues.[80]

The issue of priorities for NSF's psychological and social sciences research program was also a major focus of attention of the Study Committee on the Social Sciences in the National Science Foundation created by the National Research Council, at the request of NSF, to evaluate NSF's social and psychological sciences research support programs. With respect to priorities for research in RANN and in the basic research directorate, the group recommended priorities for support both within and among disciplines, identified mixed research topics warranting funding, and assessed issues relating to improving external peer review as a method of determining priorities.

The committee's interim report was released in February 1976 for review and criticism.[81] A revised, final report, released in July 1976, identified the following as topics warranting additional funding support by the biological, behavioral, and social sciences research directorate:

> Research involving laboratory experimentation or using advanced mathematical and other quantitative techniques appears to receive relatively high priority in most of the social sciences. While this is an appropriate emphasis in the Foundation setting, greater support needs to be provided (particularly in social psychology, economics, sociology, and political science) for studies using techniques of field research and ethnographic analysis of social institutions and processes. Special encouragement should be offered to substantive studies that

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[79] [illegible] S. Congress. Senate. Committee on Appropriations. Department of Housing, Space, S[illegible] Veteran's and Certain Other Independent Agencies Appropriations, Fiscal Year 1974, [illegible] 2. Hearings, 93d Cong., 1st sess. Washington, U.S. Government Printing Office, 1973. [illegible] 124–1125.

[80] N[illegible]ermitted CRS to read this report, but asked CRS not to quote from it. The internal committee was composed of staff of RANN, the Research Directorate, and management staff.

[81] Social and Behavioral Science Programs in the National Science Foundation. By the Committee on Social Sciences in the National Science Foundation, Assembly of Behavioral and Social Sciences. The National Research Council. Washington, D.C., National Academy of Sciences, 1976. 96 p.

> show good promise of advancing these latter methodologies and making them more reliable and informative.[57]

The organization, administration, and effectiveness of the problem-oriented social and behavioral sciences research support programs in the Research Applications Directorate were also addressed. The committee recommended a restructuring of RANN organization for support of these programs in order to better determine and fund topics requiring research support:

> The roster of the behavioral and social science programs within RANN should be modified to correspond more closely to the structure of the applied fields that will carry out the research. Many of the present research activities could be better accommodated in programs for such interdisciplinary fields as public finance, organizational administration, operations research and management science, communications, public choice, urban affairs, human performance, land use and resources management, government regulation of industry, public law, program evaluation and measurement, or combinations of these fields.[58]

D. AN INTRODUCTION TO ISSUES IN THE PROCUREMENT AND MANAGEMENT OF PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH

The issue of the Foundation's role in determining priorities for research support and managing its research support programs is exceedingly complex. The purpose of basic research in a scientific discipline is to produce knowledge for its own sake. Applied research usually has a particular end, especially the objective of accumulating knowledge and developing techniques to strengthen a discipline. Problem-oriented applied research, like that RANN supports, has as its purpose the generation of knowledge and techniques to aid in solving complex problems, generally at the interface of science and technology on the one hand and society on the other. As was noted above, both Federal administrators and scientists have found it is almost impossible to predict the future utility of expenditures for specific basic research projects. Nevertheless, it can be argued that a Federal agency which awards scarce public moneys for basic and applied research has a responsibility to insure that those research funds are awarded in a manner which promotes a steady accumulation of knowledge to advance particularly noteworthy developments or lagging areas within a discipline, and that it endeavors to provide the public, the Congress, and a potential pool of researchers with a rationale for particular types of support. In this respect, several issues relating to the Foundation's procedures for managing and awarding funds for psychological and social sciences research are discussed below.

E. THE CONCENTRATION OF RESEARCH AWARDS IN PSYCHOLOGY AND SOCIAL SCIENCES

Recent congressional activities indicate that the Congress is concerned about an equitable distribution of NSF scientific research project support awards. During hearings on the NSF's fiscal year 1976 budget, authorization and appropriations committees in both Houses addressed this issue. The report of the House Committee on Science and Technology noted that the National Science Board's recently promulgated criteria for scientific research project support were limited to:

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[57] Social and Behavioral Sciences Programs in the National Science Foundation: Final Report. By the Committee on Social Sciences in the National Science Foundation. Assembly of Behavioral and Social Sciences, National Research Council, National Academy of Sciences, Washington, D.C., 1976. pp. 6–7.

[58] Ibid., p. 8.

> Competent performance of research by the scientist and the adequacy of his institutional base;
>
> The internal structure of science itself;
>
> Utility and relevance; and
>
> Future and long-range scientific potential of the United States.[84]

"Although these criteria reflect a thoughtful analysis of how research proposals should be evaluated," the report continued, "there is no reference whatever anywhere in this document to the statutory criterion regarding the need to avoid undue concentration." [85]

Specifically with respect to the Foundation's statutory responsibilities to insure geographic distribution the report noted:

> A further purpose of making Scientific Research Project Grants is to insure that scientific research is broadly distributed throughout the research institutions of the country. The purpose is to insure that the concentration of research supported by the Foundation in a limited number of institutions is avoided, and that the strengthening of research and teaching capabilities in all institutions is actively pursued. This policy is explicitly set forth as a criterion in the Act under which the National Science Foundation was established. The National Science Foundation Act of 1950, Section 3(e) provides:
>
> (e) In exercising the authority and discharging the functions referred to in the foregoing subsections, it shall be one of the objectives of the Foundation to strengthen research and education in the sciences, including independent research by individuals, throughout the United States, and to avoid undue concentration of such research and education.[86]

The report also noted that recent analyses of patterns of support indicated undue concentration of awards in geographic locales. The Foundation was requested to prepare a report on how it was meeting its responsibilities to avoid undue geographic concentration.

Senator Proxmire, chairman of the Senate Appropriations Subcommittee dealing with NSF, also addressed this issue. He criticized especially the concentration of social science awards among a few top universities. His staff analysis of data supplied by NSF indicated:

> The top 4 universities receiving social science grants control 31.4 percent of the grants, the top 8 control 48.3 percent of the grants, and the top 20 controlled over 73.5 percent of the grants. That compares closely with oil refining and also it compares with the concentration in steel tubing, the same kind of concentration ratios—big business and big universities.[87]

An analysis of data provided by the NSF further supports the contention that awards for psychology and social sciences tend to be concentrated in American universities. NSF used two factors to identify principal recipients of awards. The first is the success ratio, that is, the percent of awards funded in relation to the number of proposals submitted by an institution. The second was the total number of dollars awarded to an institution.

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[84] U.S. Congress. House. Committee on Science and Technology. Authorizing Appropriations to the National Science Foundation. March 14, 1975. House Report No. 94–66. 94th Cong., 1st sess. Washington, U.S. Government Printing Office, 1975. pp. 143–144. The NSB report is "Criteria for the Selection of Research Projects by the National Science Foundation." 9 p. (NSF–74–300.)

[85] Authorizing Appropriations to the National Science Foundation, Report 94–66, ibid., p. 144.

[86] Ibid., p. 143.

[87] U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development, and Certain Independent Agencies Appropriations, Fiscal Year 1976. Hearings on H.R. 8070, 94th Cong., 1st sess. Washington, U.S. Government Printing Office, 1975, p. 45.

During the fiscal year 1974, 131 institutions received awards for research in psychology. The top 15 institutions, identified by the criterion of success ratio, submitted 19 percent of the proposals and received 33 percent of the grants awarded. The top 15 institutions by total amount of awards received 42 percent of the funds granted. On the average the top 15 ranked schools on each criterion received 7-8 awards each; the schools below the top 15 received an average of 1 award each. (See table 14.)

Table 14

Success Ratios, Psychology, National Science Foundation (FY 1974) 1/

Award Data / Institutions	Average Success Ratio	AWARD DOLLARS (In Millions)			
		Total Award Amount	Average Award Amount	Average Amount per Instit.	% of Total Discipline Award Amount
Top 15 Institutions (By Award Amt)	49%	$ 4.89	$ .04	$ .33	42%
Top 15 Institutions (By Success Ratio)	56%	4.28	.04	.29	36%
Top 10 Institutions (By Composite Ranking)	49%	3.71	.04	.25	32%
All Instituions (364)	30%	$11.77	$ .04	$ .03	100%

1/ Supplied by NSF.

Table 14 (continued)

NUMBER OF AWARDS			PROPOSAL ACTIONS		
Total # of Awards	Average # of Awards per Instit.	% of Total Discipline Awards	Total # of Actions	Average # of Actions per Instit.	% of Total Discipline Actions
114	8	35%	236	16	22%
105	7	33%	200	13	19%
88	9	27%	183	18	17%
323	1	100%	1062	3	100%

- Of the 364 institutions having actions taken on their proposals, 131 or 36% received awards.
- The Psychology discipline has the lowest (30%) average success ratio of all the fields of science.
- The distribution of award dollars among the institutions in this discipline is relatively even when compared with other fields of science.

Similar patterns are evidenced in data describing awards in the social sciences. Two hundred and thirty-nine institutions received awards in social sciences research project support during the fiscal year 1974. The top 15 institutions by amount of award received 38 percent of total funds awarded. The top 15 institutions by success ratio submitted 16 percent of the proposals and received 27 percent of the awards made. The average number of awards for the top 15 schools on both measurements ranged from 13 to 18. The rest of the schools received an average of 1 award each. (See table 15.)

Table 15

Success Ratios, Social Sciences, National Science Foundation [FY 1974] [1]

Social Sciences

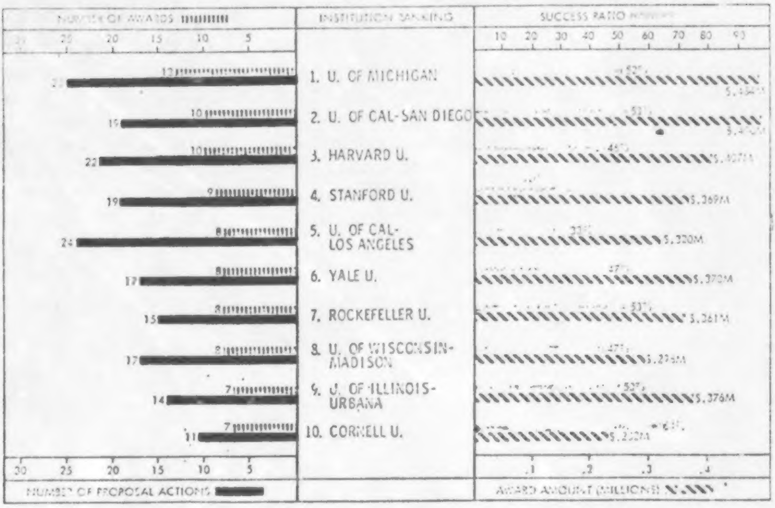
Award Data / Institutions	Average Success Ratio	AWARD DOLLARS (In Millions)				NUMBER OF AWARDS			PROPOSAL ACTIONS		
		Total Award Amount	Average Award Amount	Average Amount per Instit.	% of Total Discipline Award Amount	Total # of Awards	Average # of Awards per Instit.	% of Total Discipline Awards	Total # of Actions	Average # of Actions per Instit.	% of Total Discipline Actions
Top 15 Institutions (By Award Amount)	56%	15.96	.06	$1.06	38%	267	18	36%	486	32	24%
Top 15 Institutions (By Success Ratio)	69%	12.57	.06	.84	30%	201	13	27%	321	21	16%
Top 10 Institutions (By Committee Ranking)	57%	12.15	.05	1.22	29%	232	23	31%	409	41	[illegible]
All Institutions (572)	38%	$42.08	$ .06	$ .07	100%	745	1	100%	1988	3	100%

- Of the 572 institutions having actions taken on their proposals, 239 or 42% received awards.
- The top 15 institutions by award amount (37 of the 572 institutions) received almost 40% of total award dollars and 36% of total discipline awards.

[1] Supplied by NSF.

Table 16

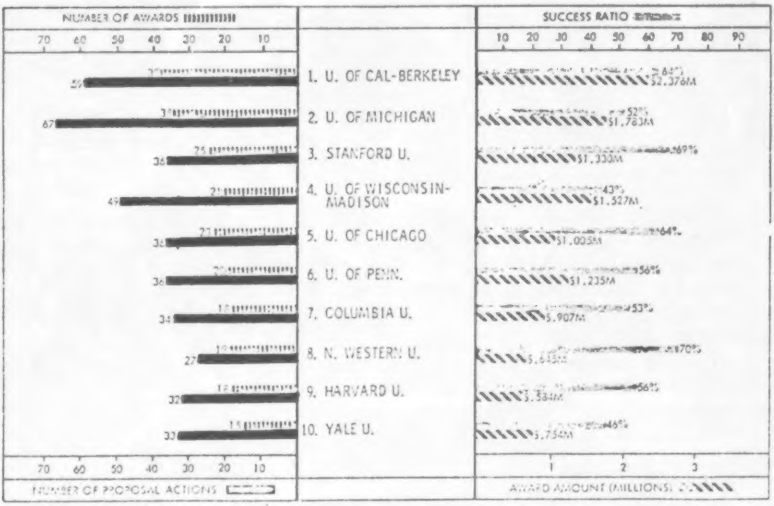
Top 10 Institutions By Composite Ranking, Psychology [FY 1974] 1/



1/ Supplied by NSF.

Table 17

Top 10 Institutions by Composite Ranking, Social Sciences [FY 1974] 1/



1/ Supplied by NSF.

The Foundation also compiles data which rank the top ten recipients in psychology and social sciences according to a composite index composed of both success rate and number of awards made. These separate composite rankings also give the amount of awards the schools received. (See tables 16 and 17.) A comparison of these two lists (table 18) indicates that five schools appeared on both lists as among the top ten schools in both psychology and social sciences, although their order of rank among the top ten varies. The schools were the University of Michigan, Harvard, Stanford University, Yale, and the University of Wisconsin. These five schools constitute 1.4 percent of the total number of schools which received awards for both psychology and social sciences in the fiscal year 1974. The five schools received 15 percent of the funds awarded, indicating that 1.4 percent of the institutions receiving awards received 15 percent of the funds awarded. (See table 18.)

TABLE 18.—A COMPARISON OF SUCCESS RATIOS OF TOP 10 INSTITUTIONS IN PSYCHOLOGY AND SOCIAL SCIENCES FISCAL YEAR 1974, BASED ON COMPOSITE RANKING [1]

Rank	School	Amount of award (millions)
PSYCHOLOGY		
1	University of Michigan	$0.484
2	University of California—San Diego	.490
3	Harvard University	.407
4	Stanford University	.369
5	University of California—Los Angeles	.320
6	Yale University	.370
7	Rockefeller University	.361
8	University of Wisconsin—Madison	.296
9	University of Illinois—Urbana	.376
10	Cornell University	.232
SOCIAL SCIENCES		
1	University of California—Berkeley	2.37
2	University of Michigan	1.783
3	Stanford University	1.33
4	University of Wisconsin—Madison	1.527
5	University of Chicago	1.005
6	University of Pennsylvania	1.235
7	Columbia University	.907
8	Northwestern University	.645
9	Harvard University	.584
10	Yale University	.754

[1] Taken from tables 16 and 17 above.

This information indicates that there does tend to be a concentration of research awards in psychology and social sciences—not necessarily a geographic concentration, but a concentration among a few performers located in the northern portions of the East, Midwest, and the West. However, a complete analysis of these patterns would require a comparison of the success ratios of all schools for a number of years as well as an assessment of other distribution/concentration variables, including such factors as correlations between award of funds and research output.

F. ATTEMPTS TO EVALUATE RESEARCH PRODUCTIVITY OF NSF'S PRIMARY GRANTEES

Criteria other than geographic distribution or concentration can also be considered in assessing the equity of the distribution of awards. For instance, if these awards had been made according to the criteria for support specified by the National Science Board in November 1974, they would have met the four criteria of:

Competent performance of research by the scientist and the adequacy of his institutional base;
The internal structure of science itself;
Utility and relevance; and
Future and long-range scientific potential of the United States.

It is exceedingly difficult, if not impossible, to do a post-facto assessment of whether Foundation-supported research performers did meet these criteria. A researcher attempting to conduct such an assessment confronts two types of difficulties. The first set of problems is posed by the conduct of scientific research itself, that is, the time lag between (1) the award of funds and the completion of research, (2) the completion of research and its publication, and (3) the completion of research and its application, citation, or use by another researcher (rates of citation analysis frequently are used as measurements of research productivity).

A second set of problems is posed by the fact that although an NSF grant award specifies that grantees must report all publications resulting from the award to the Foundation, grantees are notoriously lax in fulfilling this requirement. For instance, a program manager in the Division of Social Sciences noted:

> Documentation of scientific progress has not been aided by grantees' reporting habits. Many grantees overlook the grant letter which specifies that all findings are to be reported to the Program, in the form of copies of publications or papers, and where possible, in subject lay-language paragraphs suitable for use elsewhere in the Foundation or on Capitol Hill. In recent years program directors have exerted considerable effort extracting such information from grantees. Finally following a coordinated letter-writing appeal to grantees by two political scientists presently outside the Foundation, the current program director was able to extract a half-dozen reports of findings from grantees and these are now finding their way into annual and quarterly reports. Despite the effort, some grantees have written saying "my, that's a grand idea," but failed to offer any of their findings. One program director tells the story of an investigator who, after much nudging, sent in a two-page list of publications at the conclusion of his project and asked innocently whether the Foundation wanted to receive copies of any of the publications.[illegible]

Despite these limitations on the measurement of research productivity, several recent attempts have been made to assess the "productivity" of federally supported scientific research awards. Because these reports are somewhat contradictory and use different research techniques and data, the relationship between Federal research investment and academic research productivity remains unclear. One assessment deals with the National Science Foundation's programs in social psychology and sociology; the second looks at the objectives and productivity rates for all federally funded social research; and

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[illegible] Leege, David C., "Is Political Science Alive and Well and Living at NSF: Reflections of a Program Director at Midstream." P.S., vol. 9, No. 1, 1976: 111.

the third assesses an attempt made by NSF to evaluate the implications of providing a wider distribution of institutional support and research support funds to improve the number of high-level academic institutions. These findings are reported for illustrative purposes only.

The study of NSF-supported awards in social psychology and sociology covered the period 1964–71. First, the researchers determined that there was a high concentration of recipients in awards for these fields during the period 1964–71. For instance, in 1964, it was found that 61.75 percent of all funds awarded in these two fields went to four top recipients; and, in 1971, 50.05 percent of the funds in these two fields were awarded to four top institutional recipients. The researchers then compared the ranking of the top recipients in relation to other available indicators of their previous publication rates and their prestige ranking among top discipline departments in the Nation. They concluded that NSF awards to these top four schools were far more concentrated than might have been expected by the institution's ranking on measures of publication rates or prestige of the departments receiving the awards.[89]

Therefore although NSF awards were concentrated, they were not given necessarily to the most productive researchers.

Another researcher, whose study is not limited to the National Science Foundation, used a survey to attempt to assess relationships between the receipt of Federal social research funds on the one hand, and publication rates and prestige of recipient researchers on the other. His findings tend to indicate that Federal funds generally do go to researchers who have exhibited high publication rates and high prestige. He also indicates that in certain social science fields the Federal Government seems to be making a concerted effort to fund research which will advance the state of the art of some disciplines.[90]

The Foundation's study was an evaluation of a program it launched in the mid-1960's to upgrade "second tier" universities in the United States. The experiment, called the "Science Development Centers of Excellence Program," increased the amount of institutional development and research awards and distributed them to a wider spectrum of universities than had been done previously. Definitive findings did not emerge from the evaluation of the program,[91] but generally the study indicated that the program did not achieve one of its major purposes, that is, to double the number of first-rate research universities in the United States. On the issue of scholarly research productivity the report noted:

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[89] Pfeffer, Jeffrey, Gerald R. Salancik, and Huseying Leblebici. "Stability and Concentration of National Science Foundation Funding in Sociology, 1964–1971." The American Sociologist, vol. 9, 1974: 194–198.

[90] Useem, Michael. "State Production of Social Knowledge: Patterns in Government Financing of Academic Social Research." Manuscript, 1975. Boston University, 1975. 58 p. Included next are some excerpts from the report to better describe its method and findings. "Depending upon the specific aim of the funding, certain categories of academic social scientists are more likely to receive Federal backing than others. Actual funding patterns are observed in data from a probability sample of 1,079 faculty members in the discipline of anthropology, economics, political science, and psychology.

The observed patterns in Federal funding of academic social research indicate that two major principles structure the allocation of such funds. First, in all disciplines the government is involved in producing social research useful for Government policy formulations. * * * Second, in two disciplines—anthropology and psychology—the Government is also apparently committed to the continued internal development of the social science disciplines [measured by] (citation rate pattern). In these fields, social scientists engaged in research of high utility to the disciplines and/or the Government are significantly more likely to receive Federal funding for their work than colleagues working on less relevant topics. In addition, though the evidence is much more ambiguous, in the disciplines other than anthropology the Government may be taking steps to insure that its money is productively utilized (publication rate pattern). It appears that social scientists of proven research productivity may be more frequently backed with Federal funds than faculty members having weaker records."

> Science development funding had a positive effect on scholarly productivity as measured by rates of publication in key journals, i.e. the funded departments registered an increase in the number of articles published by their faculty members in journals that have high scholarly impact. This increase, however, was largely a function of the growth in faculty size; the effects on the publication rate of the individual faculty members were minimal.

The report also indicated that other expected results were not achieved: faculty mobility from more prestigious to less prestigious universities did not increase; lower rated schools which received funds did not attract a higher quality of graduate students; and the expected increase in rates of production of Ph. D. level graduates did not occur.[92]

G. ISSUES IN THE PROCUREMENT OF PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH

In view of the obstacles to measuring productivity and output of research awards, it is necessary to assess other factors to understand how the Foundation has determined priorities for social sciences research support and managed its research support programs. The first two issues, which will be covered next, deal with the roles of program managers, mail reviewers and advisory panels, first in proposal review, and second, in management of the psychological and social sciences research support programs. Issues which lend themselves to possible oversight will be identified. (Note that the procedures described below were taken from materials describing the Division of Social Sciences before the reorganization. There is nothing to indicate that these procedures are no longer applicable.)

1. *The roles of program managers, ad hoc groups of mail reviewers and advisory panels.*—Most of the proposals funded by the Division of Social Sciences are unsolicited. Generally, one individual, the program manager for a discipline, follows proposals through from receipt at the Foundation, to either declination or the award of funds and reporting of the final research product. Generally, program managers are Ph. D. level professionals in respective social sciences disciplines supported by the Division. In addition to their administrative responsibilities, program managers serve as a liaison between the Foundation and a discipline—describing the Foundation's policies at annual discipline meetings, reporting to the Foundation on emerging needs of the disciplines, and in many cases, assisting their professional

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[91] Prepared by the National Academy of Sciences.
[92] Walsh, John. "NSF Science Development Programs: 'Centers of Excellence' Revisited." Science, July 18, 1975: pp. 201–203.

discipline colleagues in discussing anticipated Foundation funding or the likelihood of proposal acceptance in the preproposal stage.[93] During the last few years, the Foundation has attempted to improve this interface by hiring academics, who are on leave without pay, for a 2-year rotational tour of duty as program managers.

Program managers are assisted in proposal review by both mail reviewers and by advisory committees created by the Foundation for specific disciplines. The Foundation explains the procedures used as follows:

> When formal proposals are received, they are usually sent to a number of specialists for evaluation. Six of the Division's ten programs used assembled Advisory Panels of five or six members (who normally meet three times a year and whose members usually serve for two-year terms). In most cases, about three additional specialists are asked to submit written reviews by mail. Programs that do not employ assembled panels usually request from four to six ad hoc reviews. At least 2,000 different scientists assisted in proposal evaluation during the most recently completed fiscal year. An important characteristic of these reviews is that they include much more than recommendations to "fund" or "not fund." They provide many specific comments which (after being transmitted, in summary form, by the program directors) result in beneficial modifications of research plans.
>
> In many cases, too, applicants who do not receive grants because of the severe competition for funds are able to benefit from summaries of the reviewers' critical advice, which they use to plan modified projects for resubmission or to carry out more limited investigations with alternative resources.
>
> After receiving the proposal reviews, the program directors may request clarifications and additional information from applicants. Sometimes site visits are made, occasionally involving outside consultants. The program directors may recommend support for only part of the proposed research, either for reasons of budgetary priorities or because parts of the research are considered less significant than others.
>
> Program directors' recommendations for awards and declinations are reviewed by the Division Director, who ascertains whether the review record adequately supports the recommendation, and in particular whether apparently important questions raised by reviewers have been dealt with. The Division Director examines the record from the standpoint of Foundation policy, and if necessary requests changes in action or amplification of the record that will ensure that the decisions are in strict conformity to NSF policies. Some types of grants may require approval by the Deputy Assistant Director for Research, or if precedents are involved, the concurrence of the General Counsel and the National Science Board.[94]

This statement, prepared by NSF, indicates that advisory panels play a significant, if not predominant role in proposal review. Consultations with Foundation officials and social scientists indicates, however, that frequently the *ad hoc* groups of mail reviewers may play a more significant role in proposal review than do panel members. It has also been reported that the role of the panels is limited to advising the Foundation on general programs and policies in a particular discipline; usually panel members do not rank proposals.

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[93] Carroll, for instance, notes: "The program directors perceive themselves as performing two roles: (1) representing the members of their field within the Foundation, and (2) representing the Foundation to the members of their fields. The program directors represent the members of their fields within the Foundation by participating in the budgetary negotiations that determine how much money is allocated to each program, and by working with the Advisory Panel for their fields. The program directors represent the Foundation to members of their field by visiting universities and attending conferences, and advertising prospective applicants about NSF programs and opportunities for support. Each of the program directors is available, on request, for consultation with prospective applicants about the form of proposals, the criteria used in proposal evaluation, and similar matters." (Carroll, James D. "Notes on the Support of Political Science Research Projects by the Division of Social Sciences of the National Science Foundation, Fiscal Years 1958–1965." In U.S. Congress. House. Committee on Government Operations. Subcommittee on Research and Technical Programs. "The Use of Social Research in Federal Domestic Programs" (Part IV. Current Issues in the Administration of Federal Social Research), a Staff study. 90th Cong., 1st sess. Washington, U.S. Government Printing Office, 1967. p. 90. (Committee print.)

[94] U.S. Congress. House. Committee on Science and Technology. Subcommittee on Science, Research, and Technology. 1976 National Science Foundation Authorization. Hearings on H.R. 3562, February 1975. 94th Cong., 1st sess. Washington, U.S. Government Printing Office, 1975. 150–151.

NSF's peer review mechanisms are being modified and are under continued study. In December 1975 the Foundation announced the formation of Award Review Boards in each program directorate. These Boards, composed of NSF staff, review all recommended awards to insure that awards meet program objectives, are high caliber research, and have been reviewed for sound management practices.[95] Also beginning in January 1976 the Foundation, at the instruction of the National Science Board, began providing investigators with verbatim copies of proposal reviews and with the reasons for rejecting a proposal. However, the names of mail reviewers for particular proposals will remain confidential.[96]

The House Committee on Science and Technology has asked the Foundation to conduct a study of peer review. As a result the National Science Board and the committee are cooperating in surveying previous reviewers and researchers who have submitted proposals to NSF to obtain a better understanding of the effectiveness and equity of the peer review system.[97]

In this connection it should be pointed out that suggestions have been made that the Foundation revise its peer review system by adopting the peer review panel mechanism used by the National Institutes of Health. Such a system, it is noted, would provide the Foundation with more continuity in review and would provide more and better external advice on the ranking of different proposals in the same fields.[98]

Current studies of NSF's peer review system might appropriately and usefully give special attention to peer review mechanisms in the psychological and social sciences.

2. *An apparent absence of advisory panels to review some fields of science and large-scale priority projects.*—Several other issues relating to the role of advisory panels for the social sciences seem to warrant attention. These are the absence of panels for some fields of social sciences and an apparent lack of advisory panel mechanisms for assisting in formulating and managing some large-scale projects, institutional support programs, and continuing programs.

The Foundation's "1975 Annual Report" indicated that the Foundation has constituted advisory panels for some, but not all, of the psychological and social sciences program areas supported. Discipline panels exist for: psychobiology, anthropology, economics, history, and philosophy of science, political science, social psychology, and sociology.[99]

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[95] Statement by Dr. H. Guyford Stever, Director, NSF, before the Subcommittee on Science, Research and Technology, Committee on Science and Technology, November 20, 1975, prepared testimony, p. 12.

[96] Resolution approved by the National Science Board. June 20, 1975. Described in: U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development-Independent Agencies Appropriation Bill, 1976, [illegible] Rept. No. 94–326, July 24, 1975. 94th Cong., 1st sess. Washington, U.S. Government Printing Office, 1975. pp. 59–60.

[97] NSB Announces Survey on Peer Review System. National Science Foundation News, Nov. 21, 1975, p. 2.

[98] Zerkel, Fred H. "Handler Assesses Federal Science Affairs." Chemical and Engineering News, May 5, 1975: 18–19.

There were no advisory panels listed for the other fields, for instance in geography, special projects, social indicators, linguistics, law and social sciences, and science policy research. It seems reasonable to question whether NSF should give more attention to the need to seek appropriate advice for the social science fields which might not now benefit from the programmatic and policy guidance of advisory panels.

The importance of this point is underscored by the fact that the Division of Social Sciences has awarded considerable funds for a number of large-scale projects which seem to be designed to (1) provide institutional support, (2) hasten and coordinate development of certain areas of social science, or (3) develop interdisciplinary models and data bases. Most of these projects are funded under the special projects and social indicators programs, which did not have advisory panels during the fiscal years 1974 or 1975. A few projects of this nature from the fiscal year 1975 report on grants and awards of the Division of Social Sciences have been identified and their funding traced from the original grant to the present. In most cases, considerable funds have been obligated for large-scale projects. The Foundation undoubtedly uses *ad hoc* reviews and consultations with outside professionals to seek guidance in establishing new program emphases or when funding cumulatively large continuing awards for specific interdisciplinary projects. However, the question can be raised about whether *ad hoc* reviews are sufficient for large interdisciplinary program areas of continuing duration or whether these programs might profit from establishment of panels to help guide them.

For example, who, other than Foundation personnel, helped make the decisions that a social indicators support program should be started, and that the Foundation should help establish institutional support programs both to evaluate social indicators research and also to collect special time-series data at the University of Michigan, the National Bureau of Economic Research or the National Planning Association? Similarly, the Foundation has awarded considerable funds for programs in mathematical social sciences and for a management operations research facility. Has the Foundation consulted with professionals outside of the NSF in determining these priorities and the funding levels for the programs it supports?

Full details of the funding history to the fiscal year 1975 of selected illustrative large-scale projects of this nature are given in table 19. In summary they are: special program of research seminars and conferences to be conducted by the Mathematical Social Science Board, total funds awarded: $1.076 million; advanced study and research in social sciences, total funds awarded: $.488 million; operation of a management science research facility, total funds awarded: $1.085 million; Center for Coordination of Research on Social Indicators, total funds awarded $.847 million; national data program for sociology, total funds awarded: $.422 million; Man in the Arctic, partial funds awarded: $.400 million; and research on the energy-modeling process, total funds awarded: $.750 million.

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[99] App. A. National Science Board, NSF Staff, Advisory Committees and Panels. National Science Foundation. 25th Annual Report for Fiscal Year 1975. Washington, U.S. Government Printing Office, 1976, pp. 108–122.

The National Science Board must approve any one award which totals over $500,000 for one fiscal year or over $2 million for the total amount of the award. The Board uses its discretion in approving other awards and new program areas. It is not known whether the Board approved any of the awards included in the table. In some cases the number of the award changed while the title of the research remained the same, indicating that the total combined amount of funds for the project may have exceeded the total minimum required for Board approval since the awards were made under different proposals. (See table 19.)

TABLE 19.—*The funding history of selected large-scale projects, Division of Social Sciences, NSF* [1]

Special Projects, Fiscal Year 1975

Special program of research seminars and conferences to be conducted by the Mathematical Social Sciences Board. Principal investigator, P. S. Cutler, Center for Advanced Study in Behavorial Sciences, grant No. 70–02316, amend IV (interdisciplinary), fiscal year 1975 award: $253,600. Previous awards: fiscal year 1974, grant no. S003256 003, $212,300; fiscal year 1973, grant No. S003256 002, $166,100; fiscal year 1972, grant No. S003256 001, $222,000; fiscal year 1971, grant No. S003256, $222,000. Total awarded: $1,076,000.

Advanced Study and Research in Social Sciences. Principal investigator, P. S. Cutler, Center for Advanced Study in Behavioral Sciences, grant No. 71–0376, amend IV (interdisciplinary), fiscal year 1975 award: $107,500. Previous awards: Fiscal year 1974, grant No. S029713 X03, $102,300; fiscal year 1973, grant No. S029713 X02, $97,500; fiscal year 1972, grant No. S029713 X01, $92,800; fiscal year 1971, Grant no. S029713 X00, $88,300. Total awarded: $488,400.

Operation of a management science research facility. Principal investigator, F. E. Balderston, University of California (Berkeley), grant No. 75–08177 (interdisciplinary), fiscal year 1975 award: $157,700 (total awarded for fiscal year 1975: $207,700. Additional funds from the Division of Computer Research): Previous awards: Fiscal year 1974, grant No. S032138 X02, $322,500; Fiscal year 1973, Grant No. S032138 X01, $285,200; Fiscal year 1972, Grant No. S032138, $170,000. Total awarded: $985,500.

Social Indicators, Fiscal year 1975

Center for Coordination of Research on Social Indicators. Principal investigator: E.B. Sheldon, Social Science Research Council, grant No. 74–07148 (amend I.), fiscal year 1975 award: $335,100. Previous awards: fiscal 1974, grant no. S034219 001, $41,200; fiscal year 1974, grant No. S041704 X00, $285,400; fiscal year 1973, no award indicated; fiscal year 1972, grant No. S034219, $185,000. Total awarded: $846,700.

A national data program for sociology. Principal investigator, J. A. Davis, National Opinion Research Center, grant No. 74–15012, fiscal year 1975 award: $99,400. The Division of Social Sciences grant award report for fiscal year 1975 indicates that a total of $198,900 has been awarded, but no indication is given about whether other sections of the Foundation contributed in the fiscal year 1975 or if the award is an amendment. Previous awards: Fiscal year 1974, grant No. S031082 X03, $107,200; fiscal year 1973, grant No. S031082 X01, $87,300; fiscal year 1975, grant No. S031082 X02, $14,800; fiscal year 1971, grant No. S030182 X00, $13,800. Total awarded: $422,000.

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[1] Data for the fiscal year 1975 from: National Science Foundation. Division of Social Sciences Grant List, Fiscal Year 1975. Washington, U.S. Government Printing Office, 1975. 25 p. Data for previous fiscal years from NSF's annual reports of grants and awards.

Joint-Sponsored Projects, Fiscal year 1975

Man in the Arctic, V. Fisher, University of Alaska, grant No. OPP-72045766, amend III (special projects), fiscal year 1975 award: $50,000. The Foundation indicates that the total award for the fiscal year 1975 is $350,000. Previous awards: Fiscal year 1973, grant No. V033198 001, $50,000. We were not able to find any other previous awards although they have been made. Total awards listed here: $450,000.

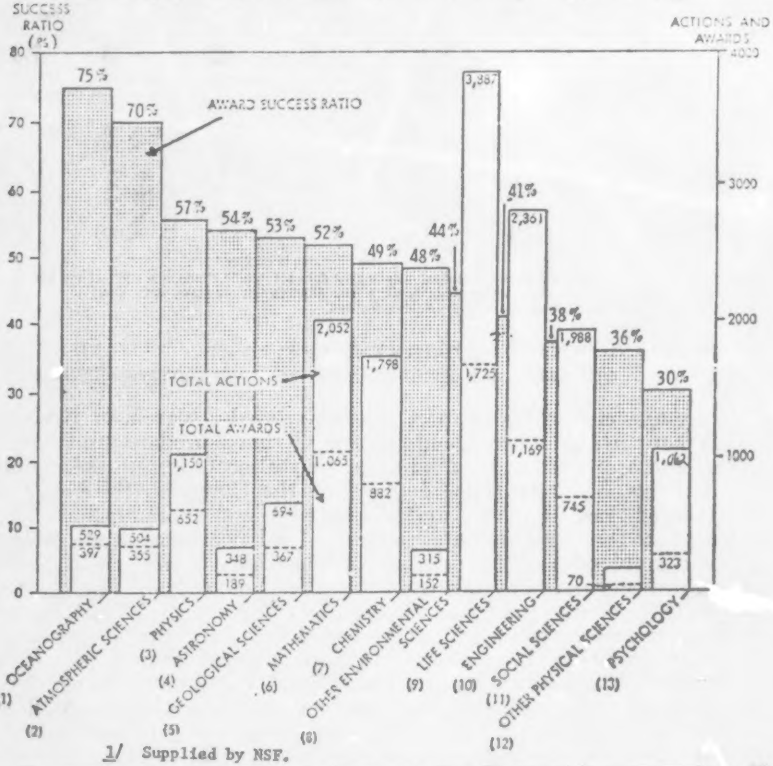
Research on the energy-modeling process. Principal investigator, J. R. Meyer and E. Kuh, National Bureau of Economic Research, grant No. DCR-7510143 (special projects), fiscal year 1975 award: $200,000. The Foundation indicates that the total awarded for the fiscal year 1975 is $750,000.

H. THE LOW STATUS AND LOW SUCCESS RATES OF PROPOSALS FOR PSYCHOLOGICAL AND SOCIAL SCIENCES RESEARCH RELATIVE TO OTHER FIELDS OF SCIENCE

Another issue which seems to require additional consideration is that while demands for research funds in all fields generally have exceeded the availability of NSF funds, the social sciences seem to have the lowest success rate of all fields of sciences supported by NSF. It was noted above that funds available to support social and psychological research have not increased as much as the potential demand determined by the increasing number of researchers in the social sciences fields. Internal NSF management data portray this situation in more detail. For instance, in the fiscal year 1974, the success rate for social and psychological research—that is, the amount of funds and proposals awarded in relation to the total amount of funds requested or proposals submitted—was considerably lower for the social sciences and psychology than for the other scientific disciplines NSF supports. This is illustrated in table 20. Psychology had the lowest success rate of all fields of science—30 percent. The social sciences success ratio was not much higher, at 38 percent. These figures are about 40 percentage points below that of the most successful field of science, oceanography, and are significantly lower than many other fields, in which half or more display success rates averaging 50 percent or more. Those fields of science which had success rates over 50 percent were atmospheric sciences, physics, astronomy, geology, mathematics, and chemistry.

Table 20

Ranking of Major Fields of Sciences By Success Ratio, NSF, [FY 1974] 1/



1/ Supplied by NSF.

The success ratios of the fields of science range from 75 percent in oceanography to 30 percent in psychology.

Success ratios for the fields of science reflect, in part, the number of scientists and competitiveness in each field.

The high rate of success in oceanography, atmospheric sciences, and other large fields is due, in large part, to the inclusion of facilities support and other activities which receive continuing support.

The data for 1974 are not inconsistent with the low success rates for social sciences exhibited from 1958 to the present. These rates, which are displayed in table 21, indicate that the amount of funds approved for social sciences research projects generally constitutes about one-fourth of the amount requested. And for the last several years considerably less than one-half of the proposals submitted have been approved. It should be noted in this respect that Foundation officials and social scientists have remarked that frequently social scientists from prestigious schools withdraw proposals rather than having them formally rejected by the Foundation.[100] There is no public information to indicate rates of withdrawal. But if proposals are withdrawn to any considerable extent, success ratios might be even lower.

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[100] Interviews.

TABLE 21.—SUCCESS RATES FOR RESEARCH GRANTS IN SOCIAL SCIENCES, DIVISION OF SOCIAL SCIENCES, SELECTED YEARS [1]

	Total number of proposals submitted	Total number of grants approved	Grants approved as a percent of the number proposals submitted	Total amount requested	Total amount approved	Percent of Total amount of funds approved [2]
Fiscal year:						
1958	115	49	42	$4,078,500	$725,950	18
1961	316	166	51	16,076,900	3,775,700	23
1964	491	246	50	32,261,300	9,378,176	26
1967	760	425	56	45,071,450	14,913,821	33
1970	1,087	467	43	64,815,760	15,985,964	25
1973	1,647	619	38	105,403,600	24,235,497	23
1974	1,539	597	39	101,144,900	24,373,661	24
1975	1,524	639	41	114,525,000	25,706,400	22

[1] Data supplied by the National Science Foundation. Note this list does not include grants in process at the end of a fiscal year. Also it does not reflect the number of grants which were withdrawn before action was taken.

[2] As a percent of total dollars requested in all proposals submitted.

I. EXPLICIT AND IMPLICIT PRIORITIES FOR THE SUPPORT OF "SCIENTIFICALLY RIGOROUS" QUANTIFIABLE STUDIES AND FOR CUMULATIVE STUDIES

Many agencies which support mission-related research, or RANN, which supports problem-oriented research have predetermined priorities and applications in mind when they allocate resources, formulate budgets, or present justifications to the Congress. Staff of the Division of Social Sciences and of other basic support agencies like it, find that they must maintain a careful balance between allocating scarce resources for continuing and demonstrably promising basic research projects and new, unproven projects whose support might later be judged of only marginal utility. Too precise a delineation of priority areas for support might lead to charges that the Government or the Foundation is attempting to impose governmental priorities or mission objectives on the private research community. Seemingly haphazard determination of priorities, based solely on the ebb and flow of unsolicited proposals which arrive each year, can generate outcries that public funds are being spent on trivial, one-shot research projects which do not help disciplines accumulate the systematic body of knowledge they need to advance the understanding of human behavior.

Much of the recent criticism of the Division of Social Sciences, emanating from both the Congress and from within the Foundation, seems to focus on the ways the Division determines priorities for research support. This issue and its implications will be addressed next.

Staff of the Division of Social Sciences have stated publicly that they use a priority-setting mechanism to determine areas warranting support. However it does not always appear as if priorities have been articulated systematically to the public or Congress, or as if clear public statements have been made describing the accomplishments and cumulative emphasis of programs. For example, the fact that the Division supports primarily only social research which lends itself to quantification and systematic analysis is stated as a priority in the Foundation's 1974 annual report: [101]

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[101] As noted above the Foundation received congressional approval for supporting social sciences on the grounds that it would support only "scientifically rigorous" and methodologically sound social science research. Carroll's analysis of the origin of social sciences

> **Although the study of mankind can be pursued from many perspectives and by many methods, research supported by the Division of Social Sciences is characterized by an emphasis on increasing scientific knowledge about human beings and their interactions with one another, with their physical and biological environments, and with the social and cultural institutions man himself has created in great variety. To be scientific, studies must obtain objective, reliable, and verifiable findings, quantified where possible. They should be able to be replicated, to have predictive qualities, and to have an ability to be generalized. This special emphasis on strengthening the scientific base of social science is an integral aspect of the Foundation's responsibility.**[102]

A second clearly stated priority is the emphasis on supporting research which leads to the systematic accumulation of knowledge or research in a particular discipline. For instance, in its "Fiscal Year 1974 Annual Report," the Foundation noted:

> **An important feature of the Foundation's efforts is the attempt to provide for continuity of support, since fundamental work rarely has a rapid payoff and since contributions to theoretical and methodological problems may not only require long years of work but may be recognized only after still longer periods of time, and often in unexpected circumstances.**[103]

J. IMPLICATIONS OF AN ABSENCE OF CLEARLY ARTICULATED PRIORITIES

Several important implications arise from this statement of priorities. The evidence that is available about Foundation programs indicates that the Foundation does use these two criteria—continuity of support, and support for scientific, rigorous, and quantifiable studies—in determining its priorities and in selecting proposals to receive awards. It would appear, however, that insufficient effort is made to articulate to the public the implications of these criteria, either for the reporting of previous accomplishments generated by divisional support or for justifying programs to the Congress.

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in the NSF concludes that the Foundation would support only those studies susceptible to quantification. He reports, in part:

In the judgment of some social scientists, the Foundation tends to superimpose on the social sciences criteria derived by analogy from the physical sciences. The most recent statement of the Foundation's interpretation of the term "science" in the context of the phrase "social science" was made by Leland J. Haworth, the Director of the Foundation, to the Daddario Subcommittee on Science, Research, and Development, on June 24, 1965:

Dr. HAWORTH. We support research in such areas as social psychology, anthropology, economics, political science, sociology, social geography, and so on . . . But we are very careful in the following senses: We really mean social science. In other words, research science is what we are talking about here, and the sort of things we support must be projects that apply the scienctific method—if you let me use the term—one in which one can really get data, and can arrive at repeatable results, not simply subjective ideas or advocacy of social theories or policies.

Mr. MOSHER. The scientific method in the social sciences is in an evolving state, isn't it?

Dr. HAWORTH. That is right.

Mr. MOSHER. I do not think the social scientists pretend to have the controls.

Dr. HAWORTH. That is right. As the scientific component of the social sciences becomes a larger and larger fraction of the total, as I believe it is in most social sciences, we can move further and further into that area.

Mr. MOSHER. Are certain mathematical techniques involved here?

Dr. HAWORTH. That is right.

(From U.S. Congress. House. Committee on Science and Astronautics. Hearings on Government and Science: Review of the National Science Foundation. 89th Cong., 1st sess., 1965, part 1. pp. 35–36. In Carroll, "Notes on the Support of Political Science Research" by the Division of Social Sciences of the National Science Foundation, fiscal years 1958–65. op. cit., p. 95.)

The NSF program manager for sociology addressed the Foundation's emphasis on quantification in sociology support before a recent session of the American Sociological Association. He was reported to have said, for instance: " 'From the beginning of the systematic support in sociology, NSF has emphasized quantification and mathematization of the field.' Ploch said. 'In all areas of our work we will continue this emphasis.' "

(Rhoades, Larry. NSF Program Outlined: Emphasized Areas Cited. ASA Footnotes, vol. 3, No. 1, January 1975. p. 12.)

[102] U.S. National Science Foundation. Twenty-Fourth Annual Report for Fiscal Year 1974. Washington, U.S. Government Printing Office, 1975. p. 30. (Emphasis added.)

[103] Ibid.

1. *Public Documents.*—For example, the Foundation's "Guide to Programs," which describes subject areas supported by the Foundation, is probably its most widely distributed publication on priorities. The section on the social sciences is exclusively descriptive; no indication is given of the need for projects to use rigorous scientific methodology or to form part of a sequence of cumulative research. The section on social sciences research reads:

> Social Sciences: Support is provided for research in the social sciences which includes investigations in:
>
> Cultural, physical, and social anthropology and archaeology.
> Economic and social geography.
> The history and philosophy of science.
> Political science.
> Social psychology, sociology, and social indicators.
> Linguistics, including computational linguistics.
> Law-related, social scientific research.
> Fundamental studies in science policy.[104]

The Foundation's annual reports state the general objectives of programs. However, they continue with descriptive statements of research accomplishments in particular projects, grouped by project area rather than discipline area. Occasionally an attempt is made in reports of particular projects to link the research findings of one Foundation-supported research project to another, but very little attempt seems to be made to delineate precisely how the project coincides with previously supported work in the area or how it specifically meets the criteria of the support program.

Even the Foundation's annual budget justification to the Congress, which includes far more detail than the Annual Reports or the Guide to programs, does not articulate clearly program emphases. Much of the submission consists of descriptions of the achievements of discrete Projects called "Significant Recent Achievements." The projects discussed first in the submission are not identified clearly as to their disciplinary support program area. Some attempt is made to describe how the work represents an accumulation of past findings or previously funded research, but these statements seem to be submerged in the project description. The reader is left with the impression that the subject of the study clearly is more important than the methodology embedded in it or its importance to the development of the state of the art of a particular discipline.[105]

The implications of this disparity are illustrated by comparing the fiscal year 1976 budget justification for social psychology and a recent congressional discussion on one project funded by the social psychology program. The budget justification material for social psychology seemed to emphasize projects which would generate specific substantive findings. For instance:

> Interpersonal relations are the subject of social psychology research, including group decision-making, communication, and opinion and attitude change.
>
> Social psychology often makes use of laboratory methods much like those in certain biological specialities. For example, communication and leadership patterns in small group behavior are studied with the aid of recording and photo-

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[104] U.S. National Science Foundation. "Guide to Programs, Fiscal Year 1975." Washington. U.S. Government Printing Office, 1974. p. 4.

[105] See for instance the section on "Social sciences program subactivity," pp. B–IX–1 to B–XI–18 of the 1976 Budget Justification.

> graphic devices. In addition, the program will continue to encourage a larger number of studies involving behavior of persons in natural (real-life) settings. In the latter case, the behavior is not controlled in any way by the psychologists, but the observations are carefully selected to minimize bias, and then they are objectively measured and recorded. Among the natural settings in which current research is being conducted are national parks, department stores, hospitals, and schools. Topics include behavior in crowds, behavior under stressful conditions such as high noise levels, employment interview and decision-making.[106]

Compare this to the Foundation's response to one of Senator Proxmire's critiques of a project supported by this program. In responding to the Senator's questions about the potentially dubious utility of the substance of the findings, the Foundation seemed to emphasize that the major objective of the research was to support the development of general measurement techniques and mathematical tools:

> ### QUANTIFICATION OF EMOTIONAL VARIABLES
>
> Senator PROXMIRE. Dr. Stever, last year I criticized a study by Dr. Clyde Nunn, a study entitled "Trends in Tolerance of Non-Conformity," which cost $350,000. I have here in my hand a letter from Dr. Nunn, who wrote to me a few weeks after the hearing attempting to defend his project and justify this expense.
>
> After five pages of summation, Dr. Nunn revealed to me that the principal finding of his study has been that now 48 percent of the American people believe in the Devil. . . .
>
> Dr. CREUTZ. I do not know why Dr. Nunn gave you that answer; I have not seen that letter, of course. However, there were some other interesting or more useful things.
>
> Senator PROXMIRE. You continued to fund that project to the tune of $83,000 in fiscal year 1974.
>
> Dr. CREUTZ. And some interesting results did come from that project other than how many people believe in the Devil. It has been found that tolerance has increased quite substantially in all sectors of society. The sources of tolerance may come from improved education, greater urbanization, and, of course, social mobility.
>
> Senator PROXMIRE. You say tolerance?
>
> Dr. CREUTZ. Tolerance of other people's beliefs.
>
> Senator PROXMIRE. Do we not know that? Is that not common knowledge (a), that it has increased, and (b), that it tends to increase with increased education?
>
> Dr. CREUTZ. Yes; but as in many social science subjects, things that we all feel sure of, it is important to find out whether or not it is true, and to what extent it is true, how we can measure some of these things. More important, perhaps, is to be able to measure how the force of these things changes with time.
>
> Senator PROXMIRE. Why would a study of the Devil or the proportion of people who believe in the Devil give us useful understanding of the——
>
> Dr. Creutz. That was only a part of the findings and probably a subsidiary one. He probably had a questionnaire—that I have not seen—where that question was asked along with others that try to put some kind of mathematical number on orthodoxy of belief, which of course is very difficult but important if we are to speak precisely of "difference of belief." We must try to do things of this sort to actually quantify some of these emotional variables, if we are to have understanding as to how people do react.[107]

2. *Priority statements in internal management documents.*—The Foundation prepares, but does not publicly disseminate several different types of priority reports. These seem to provide much more information than NSF public documents. For instance, each program manager is required to prepare an annual 3- to 5-year plan of expected priorities and financial requirements for the support of a discipline.

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[106] Ibid., pp. B–XI–11 and B–XI–12.

[107] Department of Housing and Urban Development, and Certain Independent Agencies Appropriations, Fiscal Year 1976, Senate Hearings, op. cit., p. 53.

These reports also include assessments of how previous NSF-supported research and anticipated research might foster the development of particular lines of thought in a discipline.

As another illustration of internal reports, separate program managers have, from time to time, prepared internal documents describing the state of the art of their disciplines and future NSF funding requirements. A social sciences program manager reported:

> . . . Recent program directors have devoted extensive effort to program evaluation and documentation of the discipline's progress. These reports are now being used internally to assess whether scientific progress in various sectors of the discipline is sufficient to merit infusion of additional funds. . . .[108]
>
> A previous program director devoted considerable time to documenting scientific advances made possible by the program grants; the resulting 50 page report was thorough and well done.[109]

Another type of internal planning document consists of the reports prepared by the program managers and Social Sciences Division Director for annual program reviews by the Director of the Foundation. These reports clearly identify program emphases, both methodological and substantive. They group Foundation awards both by number and funds expended over time into specific methodological or substantive support categories, and clearly describe the cumulative aspects of the program, noting how previous Foundation-supported research may have generated a significant breakthrough on which current research is intended to capitalize. An NSF official granted the writer permission to look at, but not quote, from the report on sociology prepared for the Director's program review, June 11, 1974. It contains considerably more detail on perspective and continuity of funding of programs than either the annual report or the budget justification.

Percentages of program support are categorized in the report according to major areas used in budget justification materials, and the Division's emphasis on supporting successive projects which may lead to the systematic accumulation of knowledge in a discipline is highlighted. The document also places the objectives of NSF support into the context of current research trends in the discipline.

K. THE IMPORTANCE OF CONTINUING GRANTS IN IDENTIFYING NSF'S PRIORITIES FOR SOCIAL RESEARCH

Another factor can be used to determine NSF's priorities for social sciences research. This consists of assessing and evaluating the number of continuing awards made within a discipline or for particular types of project support within a discipline. Continuing grants are especially important because the Foundation makes such awards only for high quality, potentially high-yield scientific research which requires long-term support. Specific criteria for continuing grants are:

> (*a*) Long-term research projects of high scientific merit involving U.S. scientists with a record of independent research accomplishment, or
>
> (*b*) Certain large block, core-funded, or interdisciplinary projects requiring for optimal effectiveness a greater degree of continuity than that afforded by grants of shorter duration.[110]

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[108] Leege, op. cit., p. 11.

[109] Idem., p. 14.

[110] U.S. National Science Foundation. NSF Grants Administration Manual. October 1973. Washington, U.S. Government Printing Office, 1973. p. 46. (NSF 73–26.)

In order to underscore the importance of continuing grants it is necessary to describe the two types of grant renewals made by the Foundation. The first is a renewal of support for research already in progress but which was not finished by the time the funds were used or the grant period expired. A request for renewal of support must be accompanied by a proposal and is subject to proposal review and competition against all other awards submitted during the fiscal year.[111]

The second type of grant renewal support NSF provides is the continuing research grant. Foundation grant awards are made normally for a period of 12 to 18 months. In certain cases the Foundation will make a commitment to support a project for a longer duration, up to a maximum of 5 years, subject to the availability of funds in years after the first award and to the "scientific progress of the research." The grant letter accompanying the first award (given usually for 12 to 18 months)" . . . will indicate the duration for which scientific approval has been given and the initial and projected level of support." [112] To renew support it is not necessary to submit another proposal to the Foundation. Renewal requirements consist of a brief summary of scientific progress and a short statement about budget requirements or personnel changes. Requests for renewal of continuing support do not go through the typical proposal peer review process each year. Generally, according to the Foundation, "Additional funds [which are indicated by amendments to an original grant number] will be provided to an extent necessary to extend the project an additional year at a level approximately that indicated in the original grant letter." [113]

Foundation spokesmen have not provided precise figures on the average amount of funds allocated annually for continuing grants. One published figure, attributed to Donald Ploch, program manager for the sociology program, estimated that about 20 percent of the annual budget is used for continuing commitments.[114] It is virtually impossible to verify this figure because there is no published information available identifying continuing grants. Renewals of regular grants and of continuing grants are both reported as amendments.

For instance, a selected assessment of funding patterns, i.e., new grants versus amended continuing and amended regular awards for the fiscal year 1975, indicated that some discipline programs in the Division of Social Sciences allocated over 50 percent of annual program funds to amended awards. For instance, a computation of grants awarded for the fiscal year 1975 by the Division of Social Sciences indicated that 41 percent of the grant funds awarded in the social indicators program constituted amendments and renewals.[115]

In the social psychology program, 56 percent of the funds awarded, excluding dissertation support, were for amended grants.[116] Data tabulated from the anthropology scientific research support program category indicate that amended awards constituted 49 percent of the allocated budget.[117]

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[111] National Science Foundation. Grants for Scientific Research. Washington, U.S. Government Printing Office, 1973. pp. 16–17. (NSF 73–2.)

[112] Ibid., p. 30.

[113] Ibid., p. 31.

[114] Rhoades, op. cit., pp. 1, 2.

[115] U.S. National Science Foundation. Division of Social Sciences. Grant List, Fiscal Year 1975, July 1974 through June 1975. Based on tabulation of data given on pp. 22–23.

[116] Ibid., based on tabulation from pp. 1 to 4.

Twenty-four percent of the awards in political science were for amended or continuing grants.[118] 54 percent of the funds awarded in sociology were for amended and continuing grants.[119]

1. *The need to improve analysis and oversight of continuing grant awards.*—As "long-term projects of high scientific merit" or as interdisciplinary research projects whose effectiveness depends upon long-term support, it seems reasonable that continuing awards would reflect the priorities of each program area. It also seems reasonable to question whether these priority grant renewals and "continuing areas of support" and their characteristics should not be more clearly identified to assist in providing a better picture of short- and long-range priorities and major fields of study. Such a procedure might also assist the Foundation in insuring that its support programs do not overlap with those of other agencies, and in developing and justifying its own priorities for support. Such an enumeration might also assist researchers, by giving them a clearer picture of NSF priorities for research in progress whose outcomes might suggest new priority areas requiring scientific inquiry.

Neither the annual Division reports of grants awarded, the NSF annual reports nor the annual reports of grants awarded distinguish amended continuing grants from grant renewals, or contain summary information on the number of continuing awards made, or on the percent of continuing awards versus new grants. Also, there is no clear summary of the amount of cumulative funds awarded for a particular project. For instance, during the fiscal year 1975, of the total number of amended awards granted for the sociology program, 1 grant was amended for the fifth time, 2 for the fourth time, 3 for the third time, 4 for the second time and 11 for the first time. The number of amendments for one award was not given. No clear attempt was made in any of the Foundation's public reports to justify or highlight the importance of making these continuing awards nor to identify clearly how previous scientific accomplishments in the earlier years of the grant period justified an amendment to the award.

Two examples illustrate the apparent need for improved accountability and justification in this area. An attempt to trace back a few awards from their origin to their amendment in the fiscal year 1975 posed several difficulties. First, while awards in the Division's annual report of grants and awards are categorized by subject and grant number, awards in annual Foundation grants and awards volumes are categorized by subject and then by State. The Division report does not identify the State, only the institution. Second, in some cases, the grant number and the title of the project are changed over time, presenting the researcher with the dilemma of determining whether the award attributed to an individual at an institution one year is a continuation of the award made in the following or a preceding year. (See tables 22 and 23.)

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[117] Ibid., based on tabulations from pp. 1 to 4.
[118] Ibid., based on pp. 18 to 19.
[119] Ibid., based on tabulations from pp. 11 to 13.

TABLE 22.—EXAMPLE A. OF AN AMENDED AWARD IN THE SOCIOLOGY PROGRAM[1]

Fiscal year	Grant No.	School	Researcher	Title	Amount	Duration
1975	71-03617, amend V.	Columbia University	P. M. Blau	Comparative organization research program.	$23, 100	July 1974–July 1975.
1974	S-028646-X03.	do	do	do	6, 000	No time given.
1973	S-028646-X02.	do	do	do	42, 900	12 months.
1972	S-028646-X01.	do	do	do	85, 200	Do.
1971	GS27073	do	do	do	28, 100	Do.
Total awarded					185, 300	

[1] Fiscal year 1975 data from the Division's annual report; data for previous years from NSF annual grants and awards reports.

TABLE 23.—EXAMPLE B. OF AN AMENDED AWARD IN THE SOCIOLOGY PROGRAM[1]

Fiscal year	Grant No.	School	Researcher	Title	Amount	Duration
1975	71-03532, amend IV.	Yale University	A. J. Reiss, Jr.	Evaluation and improvement of self-report measures of behavior.	$190, 100	April 1975-April 1977
1974	None					
1973	S027142	Yale University	do	Discretionary decisions in legal transactions.	80, 100	12 months.
1972	None					
1971	S27142-X	Yale University	do	do	186, 000	24 months.
Total awarded					456, 200	

[1] No awards during the period 1971 to 1974 were made at Yale for the project titled "Evaluation and Improvement of Self-Reported Measures of Behavior." However the principal investigator did receive awards for another project titled "Discretionary Decisions in Legal Transactions." Data for fiscal year 1975 from the division's report; data for previous years from NSF annual grants and awards reports.

2. *Examination of the need for a cumulative enumeration and analysis of continuing awards to aid in congressional oversight.*—Consideration might be given to modifying NSF's public reporting data to include a list which categorizes all continuing awards, or all of the preceding fiscal year's annual awards according to the major objectives identified for that program in the budget. Such a list could be used to describe new budget requirements or emphases by comparing them to the accomplishments or lagging areas identified by research already completed or in progress. Such a format might be used to describe new budget requirements or emphases by comparing them to the accomplishments or lagging areas identified by research already completed or in progress. Such a format might be used to identify those awards which stressed the development of a particular methodological technique, the generation of data to help develop a technique, or the development of better understanding or the accumulation of knowledge about a substantive issue. For instance, the fiscal year 1976 budget for political science indicated that three areas would be emphasized: political mobilization, political decisionmaking and structural changes in the political system. Each of the seven amended grants in the Division's annual report of grants and awards may be identified under one of these topics. For example: political mobilization: "issue voting: vote choice and voter change," "political involve-

ment of adolescents in four western democracies," and "collaborative research on political participation"; political decisionmaking: "organization planning and adaptation in the public sector," and structural changes in the political system: "correlates of international war," and "interdependencies of global politics."[120] All of the other awards for political science could also be so categorized.

The public reporting data might then reflect the major emphases of each area, and by referring to specific grants within a clustered category, describe the principal accomplishments or needs of each area. This format may be preferable to the format now used in the budget submission which generally describes one or two projects in depth without assessing the total spectrum of awards nor the cumulative emphases or accomplishments of a program area. It should be noted however, that some modifications would have to be made in each Division's public reporting policies in order to adopt such procedures. Discussions with NSF officials and social scientists indicate that Division policy tends to discourage reporting of research project accomplishments until after the research is published by the author in the professional journals.

3. *The need for information about priorities for the support of institutional support, equipment, data base development and student training.*—From discussions with social scientists and reports prepared several years ago on priority areas for NSF support, several other areas of reporting and priority setting have been identified which seem to require clarification. Social scientists are especially concerned about Foundation policies and awards for student training, equipment, the development of longitudinal or time-series data bases, and institutional support for the development of special research centers.[121] The Foundation undoubtedly supports several projects which meet these objectives.

It is difficult to identify these from project titles. Furthermore, awards for data development or longitudinal studies are scattered throughout the reports of awards for the various disciplines, and are not reported together in one section. Similarly not all awards for development of institutions are reported under the category of special projects. Reporting, both to the Congress and the public, might be improved if the Foundation gave more attention to identifying these areas and the awards which supported them. Such a reporting procedure might also permit the Foundation to better publicize the work that it has been doing to serve as the lead Federal agency for improving some aspects of social and psychological sciences, including the methodologies of survey analysis, modeling, and the development of quantitative methods to advance the social sciences.

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[120] This list was determined only by project titles, so it may not be precise. It is merely illustrative.

[121] Recommendations for increased NSF funding for longitudinal data series were included in both the Brim and Bass reports: the Bass report recommended that the Foundation give attention especially to funding younger researchers as well as sustained project support in key areas over a long-time period: both reports recommended that the Foundation give more attention to the funding institutions to conduct basic and applied social research. The Brim report is: U.S. National Science Foundation. Knowledge Into Action: Improving the Nation's Use of the Social Sciences. Report of the Special Commission on the Social Sciences of the National Science Board. Washington. U.S. Government Printing Office, 1969. See especially pp. xvii–xxi. The Bass report is: U.S. National Academy of Sciences. The Behavioral and Social Sciences: Outlook and Needs. A Report on the Behavioral and Social Sciences Survey Committee Under the Auspices of the Committee on Science and Public Policy. National Academy of Sciences and the Committee on Problems and Policy. Social Science Research Council. Washington, National Academy of Sciences, 1969, see especially pp. 238–243.

L. ASSESSMENT OF THE NEED FOR A BALANCE IN BASIC RESEARCH BETWEEN "SCIENTIFICALLY RIGOROUS" QUANTITATIVE STUDIES AND INSTITUTIONAL OR CASE STUDY RESEARCH

Another issue of continuing importance is the extent and appropriateness of the Foundation's emphasis on supporting "scientifically rigorous" quantitative studies. As noted throughout this report, early congressional critics opposed to giving NSF a clear mandate in social sciences research seem to have been appeased by the Foundation's emphasis on supporting "scientifically rigorous" quantitative, as opposed to softer, less rigorous, institutional or historical social sciences studies. Considerable attention has been given to assessing the potentially negative implications of this emphasis for the support and advancement of the disciplines. For instance, Carroll noted:

> Support by NSF of social science projects directed to problems that are susceptible to quantifiable or otherwise "hard" scientific analysis to the exclusion of support of projects directed to problems not susceptible to these approaches, raises the problem of the possible distortion of social science disciplines in the direction of methodologies and standards derived from the physical sciences. Some political scientists and other social scientists argue that if NSF is going to support social science research at all, it should do so according to the internal logic and methodologies of the various disciplines, rather than in terms of standards derived from an abstract idea of what does and what does not constitute "science." [122]

And in response to a recent article describing the NSF program manager's emphasis on the Foundation's support of mathematical sociology studies,[123] one sociologist lamented:

> It is time that someone within the profession call to question, through sociological modes of analysis, the increasing trends toward "mathematization" and quantification of sociology. Long ago, Sorokin . . . and C. W. Mills warned of the dangers, respectively of "quantrophrenia" and the indulgence of the "higher statisticians." Despite such warnings, however, present-day sociology is increasingly dominated by . . . "quantification freaks." I was appalled, for example, by the statement recently published in *Footnotes* of . . . the . . . head of the sociology [program] of the National Science Foundation. [He] . . . announced that

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[122] Carroll. Notes on the Support of Political Science Research Projects by the National Science Foundation, Fiscal Years 1958–1965, op. cit., pp. 95–96.

[123] Rhoades, Larry, NSF Program Outlined: Emphasized Areas Cited. ASA Footnotes, v. 3, no. 1., January 1975: 1, 12. The discussion with the NSF program manager for sociology was reported as follows:

Areas of special emphasis within the sociology program are quantification and mathematization, status attainment and social mobility, social change and survey methodology.

"From the beginning of systematic support in sociology, NSF has emphasized quantification and mathematiciation of the field," [he] said. "In all areas of our work we will continue this emphasis. There will be no lessening of the effort over the next few years although we will alter the focus somewhat to support his directions in the field."

[He] said most everyone understands what it meant by quantification, assigning numerical values to phenomena, but he does not believe mathematicization is as well understood:

"Mathematicization is concerned with the logical structure of arguments. Even if the researchers can't do the math themselves, their statements should be phrased so that someone who knows math can develop equations to fit their arguments.

"We have no particular mathematical framework in mind for this. The best may not be developed yet. Since the reality we are dealing with is not stable, there is no reason to believe that the functions will be stable. The functions may need socio-historical parameters on them."

[He] feels the work in graph theory, networking and categorical data models is coming to maturation and will be important components of NSF funding through the next few years:

"We will also begin to fund projects where the basic equations are exponential and where the attempt to fit curves to sociological data is based on multiplicative and exponential models."

> the funds of this . . . body would be dispensed to further the exact kind of quantificational studies that define the nature of sociology, in effect as to impose a linear, "mathematical" order upon the often irregular and organic character of social and cultural reality. What is wrong with such efforts and why is the increasing tendency of the "gatekeepers" of sociology: the prestigious journal editors and Foundation heads—to fund and support only such efforts likely to lead to the increased lack of sociology as a science rather than to the respected status of science that its empirical exponents so greatly desire for it?
>
> To begin with, physicists and other natural scientists, whose status empirical sociologists so covert, have already gone way beyond the point at which they perceive the cause-effect model, and its related imposition of linearity, upon natural phenomena as the basic goal of their disciplines. Physicists in particular, are at this time continually running head-on into discoveries and confrontations with phenomena which simply do not fit the older models. "Quarks," for example, are physical phenomena for which there are no known linear-model explanations. In short, in its efforts to become more "scientific" and to enjoy the status of "Scientists," present-day sociologists are operating on very outmoded models of the physical sciences. . . .
>
> What is the eventual outcome of such trends? It seems to me that even though we thought we had left Comte behind long ago, there are still many sociologists, including those in positions of most power, who still seek to actualize his dreams of the "sociologist-priest" who will be able to hold sway over the masses through esoteric symbolization that passes and substitutes for genuine insight and understanding into social phenomena. This, to some extent, has already happened to economists, whose access to the corridors of power is so covertly envied by sociologists. But of what use are the arcane "mathematical" models of the econometricians in dealing with the current economic scene? It it not possible that those in power may soon wake up to the possibility that the very misconceptions of economic forces that such impressively arcane theories of their advisors promulgate, are not in part responsible for the obviously bad economic advice they have been receiving? Do sociologists want to go the same route? Are we, like the monks with their hair shirts and other ascetic "rigors", ultimately to render ourselves useless and ridiculously obsolete in the pursuit of "rigor" rather than insight?[124]

According to the data presented above, the NSF supports a considerable amount of academic basic and applied social and pyschological research. In fact NSF is the major Federal supporter of basic research in a number of disciplines. In view of the criticisms that NSF support may be influencing disciplines into methodological and quantitative directions which may not necessarily advance the state of their development, and the calls for more support of studies assessing politically sensitive normative issues, it may be necessary to give further attention to the issue of the Foundation's apparent emphasis on supporting quantitative and methodologically sophisticated research. It is not possible to give a complete assessment of this issue because project titles alone do not reveal enough about a grant to enable the researcher to determine whether the substance or the methodology of a study is being emphasized. It is evident that many studies would not be funded unless they met the criteria of methodological sophistication expected by the Foundation. It is likely that the NSF may place less importance on the substantive findings of some studies and more on the methodology or techniques embodied in them (such as survey research methodology, modeling, improvement of statistical analysis techniques, et cetera). However, there is also some evidence to indicate that many basic and applied studies are nonquantitative, and that the Foundation may support nonquantitative studies to enhance understanding of the links between science, technology and society. It may be useful to determine whether the Foundation's support priorities for quantitative studies effectively complement the support priorities of the disciplines, as well as those of other Federal agencies. Some Federal agencies, which fund disciplinary areas also funded by NSF, allocate considerably larger research support sums to them than the Foundation does.[125] A clearer and more detailed statement of NSF's priorities for its disciplinary support programs would assist in determining if the Foundation is playing a principal role in developing the methodological basis of the social and psychological sciences or if its program duplicate those of other agencies.

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[124] Flynn, Charles P. Quantification: No Substitute for Insight. ASA Footnotes, April 1975: 2, 3.

Another issue would be the extent of attention the NSF has given to determining whether a critical mass has been reached in quantitative methodologically sophisticated studies, and if so, whether more attention might be given to funding other basic research studies which use nonquantitative methods, such as case studies or institutional approaches.

M. COORDINATION OF NSF PSYCHOLOGICAL AND SOCIAL RESEARCH PROGRAMS

Several issues related to the coordination of NSF's psychological and social research support programs may also require additional attention. These issues deal with: (1) coordination between research supported under the basic and applied research support program and applied social research supported in the RANN program, and (2) coordination between NSF's research support programs and those of other Federal agencies.

1. *Coordination with the RANN program.*—In the section below on RANN, it is noted that some of RANN's applied social research projects are basic in nature and that some of its applied or problem-oriented research may be premature because there is insufficient basic information about the particular topics. There is no information to indicate that RANN program managers and social and psychological sciences program managers in the Division of Social Sciences and the Division of Behavioral and Neural Sciences coordinate their research support or provide researchers with information to stimulate cross-fertilization in the development of knowledge. It would seem appropriate to examine coordination between these programs.

2. *Coordination with research supported in other agencies.*—It may also be useful to consider evaluating the extent to which NSF support programs complement or duplicate those of other agencies. Some general lines of inquiry are suggested by looking at agency funding patterns for psychological and social sciences research. Tables 24 and 25 give fiscal year 1976 estimates for the support of basic and applied social sciences and psychology research for: (1) total Federal spending, (2) for NSF, and (3) for the two or three other agencies which allocate more support to each discipline than NSF does.

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[125] See section M, next.

TABLE 24.—FEDERAL OBLIGATIONS FOR BASIC AND APPLIED RESEARCH IN SOCIAL SCIENCES, TOTAL, NSF, AND MAJOR FEDERAL AGENCY SUPPORTERS, FISCAL YEAR 1976, ESTIMATED

[In millions of dollars; other agencies listed below constitute those which are among the top agencies supporting such research; rank in parentheses] [1]

	Anthropology	Economics	History	Linguistics	Political science	Sociology	Social sciences, NEC
A. Basic research in social sciences:							
Total Federal agency obligations	$7.3	$28.3	$7.6	$1.95	$2.6	$16.3	$28.5
NSF obligations and order of rank among all Federal agencies	4.1 (1)	7.2 (2)	.96 (3)	1.5 (1)	1.4 (1)	2.1 (3)	10.3 (2)
Other principal Federal agency obligations and order of rank;							
Department of the Interior	1.1 (3)						
Smithsonian Institution	1.8 (2)		5.02 (1)				
Department of Agriculture		16.6 (1)					
Department of Health, Education, and Welfare		3.2 (3)				5.02 (2)	12.8 (1)
Department of Justice			1.49 (2)			7.7 (1)	2.2 (3)
Department of Defense					1.03 (2)		
B. Applied research in social sciences:							
Total Federal agency obligations	6.7	111.8	.366	.912	9.7	57.8	77.8
NSF obligations and order of rank among all Federal agencies		1.8 (6)			.270 (8)	.670 (7)	15.3 (2)
Other principal Federal agency obligations and order of rank:							
Department of Health, Educaton, and Welfare	6.6 (1)	22.98 (2)		.892 (1)	1.1 (3)	37.4 (1)	44.5 (1)
Department of Agriculture		38.1 (1)	.25 (1)				
Department of Housing and Urban Development		12.3 (4)			4.2 (1)		13.6 (3)
Department of Labor		17.8 (3)					
Department of Defense					1.3 (2)		
Department of State					1.04 (4)	3.8 (2)	
Department of Justice						7.0 (3)	

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[1] Data from U.S. National Science Foundation Federal Funds for Research, Development, and Other Scientific Activities, fiscal years 1974, 1975, and 1976. Vol. XXIV. Detailed Statistical Tables. Washington, U.S. Govt. Print. Off., 1975. (NSF 75-323.)

The following lines of inquiry are suggested for the social sciences disciplines. As table 24 shows, NSF supported more basic research in anthropology than any other agency during the fiscal year 1976. The Department of Health, Education, and Welfare (HEW) was the primary supporter for applied anthropological research. It seems clear in this case that NSF priorities are basic and methodological in nature. Similar patterns are evidenced in the Foundation's support of linguistics.

During the same year, NSF played a major role in the support of basic research in political science. However the Department of Defense (DOD) funded almost as much for this discipline as NSF did. Questions of duplication or differences in emphases might be raised in the case of basic research support for political science. Most applied political science studies were supported by other Federal agencies, with the Department of Housing and Urban Development (HUD) playing the major role among all Federal agencies. NSF support for applied political science was negligible when compared with the support provided by other agencies.

NSF played a minor role in the support of history—its programs being limited to the history and philosophy of science. The Smithsonian Institution was the primary supporter of basic history studies; Federal expenditures for applied history studies were negligible.

NSF ranked second along all Federal agencies in the amount of support allocated to basic research studies in economics. It funded about $7.2 million for this area in the fiscal year 1976, slightly less than half the amount obligated by the major Federal agency supporting basic research in economics, the Department of Agriculture. Agriculture's funding for basic economics research was provided by the Economic Research Service and the Cooperative Research Service. With respect to total basic and applied funds for economics research, NSF funded about one-twentieth of the total Federal amount obligated. Despite the relatively small role played by NSF, it may be useful to obtain a better picture of its priorities for this area in relation to those of other agencies which in addition to Agriculture were HEW, HUD, and the Department of Labor. It might be useful to explore the differences between basic and applied research support and the extent to which NSF basic studies are not duplicated by those of other agencies, especially with respect to developing general econometric models.

NSF played a minor role among all agencies in support of sociology. The agency supported about $2.1 million in basic research studies, ranking as third, and about $0.670 million in applied studies, ranking seventh. However, since other agencies funded considerably larger sums of sociology research, it may be necessary to identify the precise NSF objectives for this discipline. For instance, did NSF-supported studies in social change, stratification, and mobility duplicate those funded by the National Institutes of Mental Health, the Law Enforcement Assistance Administration (LEAA), and Office of the Secretary at HEW?

NSF played a major role as supporter of research classified as social sciences, NEC (not elsewhere classified). This category is used for reporting RANN applied social research projects and other interdisciplinary projects, such as law and social sciences and social indicators. The agency ranked second among all supporters of basic NEC social sciences research and third for applied NEC research. It seems obvious that this NEC reporting category is inadequate, since agencies fund substantially different types of interdisciplinary studies and studies which do not fall within existing discipline reporting categories. Therefore, it may be useful to assess further the possible duplication between NSF and other major supporters of such research, such as HEW, HUD, and LEAA and also to seek improvement of the NEC reporting category.

Most NSF support for psychology is for biologically oriented basic research studies. Obligations for applied psychology research were quite small during the fiscal year 1976, est. However, since NSF ranked second to HEW and its affiliated agencies as a supporter of basic biologically oriented psychology studies, it may be important to determine the similarities and differences in these agencies' support programs. (See table 25.)

TABLE 25.—FEDERAL OBLIGATIONS FOR BASIC AND APPLIED RESEARCH IN PSYCHOLOGY ,TOTAL, NSF, AND MAJOR FEDERAL AGENCY SUPPORTERS, FISCAL YEAR 1976, ESTIMATED

[In millions of dollars; other agencies listed below constitute those which are among the top agencies supporting such research] [1]

	Biological aspects	Social aspects
A. Basic research in psychology:		
Total Federal agency obligations	23.778	20.882
NSF obligations and order of rank among all Federal agencies	4.5 (2)	2.3 (3)
Other principal Federal agency obligations and order of rank:		
Department of Health, Education, and Welfare	15.4 (1)	7.9 (2)
Department of Defense	3.4 (3)	8.8 (1)
B. Applied research in psychology:		
Total Federal agency obligations	32.1	57.5
NSF obligations and order of rank among all Federal agencies	.9 (5)	.3 (6)
Other principal Federal agency obligations and order of rank:		
Department of Health, Education, and Welfare	21.1 (1)	16.8 (2)
Department of Defense	4.5 (2)	31.3 (1)
National Aeronautics and Space Administration	1.39 (4)	6.7 (4)
Veteran's Administration	4.2 (3)	12.0 (3)

[1] Data from U.S. National Science Foundation. Federal Funds for Research, Development, and Other Scientific Activities. Detailed Statistical Tables. Washington, U.S. Govt. Print. Off., 1975.

Another issue with possible implications for oversight concerns the possible duplication between the NSF basic and applied research support programs and the basic and applied research support programs of the National Endowment for the Arts and the National Endowment for the Humanities, (NEA) and (NEH).

Both of the Endowments support research in history, economics, political science, social psychology, sociology, linguistics, and archeology and anthropology. They emphasize, however, that their support is limited to studies which are historical, philosophical, or intellectual in nature.[126] The Science Resources Section of the NSF does not report Endowment grants in its annual reports of *Federal Funds for Research, Development, and Other Scientific Activities*, presumably on the basis that such research is not scientific in nature. This may undoubtedly be so, but a review of some of the awards given by these agencies indicates that some projects might have been supported as appropriately by the NSF, from either the basic and applied research support programs or the RANN program.

For instance, during 1971, the National Endowment for the Arts sponsored the City Edges research program "to sponsor planning and design studies of ways cities could better treat and develop freeways, river fronts, suburban fringes, and other natural and manmade edges of cities." [127]

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[126] See National Endowment for the Humanities. Eighth Annual Report (1973). Washington, U.S. Government Printing Office, 1974.

[127] U.S. Comptroller General. Propriety of the City Edges Grants Awarded to the Suburban Action Institute. National Endowment for the Arts. Sept. 5, 1974. 15881, p. 1.

The project involved awards to several different cities throughout the Nation. A description of the project carried out in New York with a $38,000 award explains the research involved:

> Architects, planners, and social scientists will look at these five communities as a design process in which the city edge of the New York metropolitan region is defined. The essential question to be answered in this study is: Can racially and economically integrated communities be placed not at the metropolitan edge, but farther out in the countryside in order to define that edge with green space? Will suburban development continue to grow out to meet these towns as it has met many older suburbs which were once seen as "Garden suburbs" or can the pattern be broken?[128]

The GAO investigated the propriety of this study and concluded that it was appropriate since the Congress had in 1968 amended very broadly the act creating the National Foundation on the Arts and Humanities, by giving it additional responsibilities to study the human environment.[129]

It would seem conceivable that such studies might have also been funded by the NSF, especially from the RANN program.

The National Endowment for the Humanities obligated $9,698,814 for grants in the fiscal year 1973, exclusive of fellowships and other educational activities. About half of this amount, $5,293,533, consisted of Federal funds. The total number of grants awarded was 239.[130] The National Science Foundation has reported to the Congress that it coordinates closely with the NEH and the NEA to avoid duplication.[131]

However, a comparison of some of the project titles for awards made by NEH in fiscal years 1973 and 1974 and the project titles of awards made by the Division of Social Sciences of the NSF in the fiscal year 1975, indicates that there seems to be considerable duplication between substantive foci of the studies. Also, in some cases, NEH studies may use quantitative methods. (See table 26.)

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[128] Ibid., p. 10.

[129] Ibid., p. 1.

[130] Eighth Annual Report, op. cit., pp. 39 and 69.

[131] Congressional instructions to avoid duplication and to coordinate projects were included in: U.S. Congress. Senate. Committee on Labor and Public Welfare. National Science Foundation Act Amendments of 1968. S. Rep. No. 113[illegible], 90th Cong., 1st sess. May 21, 1968. Washington, U.S. Government Printing Office, 1968, p. 14. More recently, the NSF reaffirmed to the Congress that it coordinated with the NEH and the NEA in U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies Appropriations for fiscal year 1975. Hearings on H.R. 15572, Pt. 2. 93d Cong. 2d sess. Washington, U.S. Government Printing Office, 1974. pp. 840–841.

TABLE 26.—*A comparison of selected awards for research made by NEH, fiscal years 1973 and 1974, and NSF, division of social sciences, fiscal year 1975* [1]

NEH 1973 and 1974	NSF Division of Social Sciences, 1975
The Comparative Study of Slavery	
Positive Influences of the Negro Family on Educational Achievement and Social Mobility	Residential Mobility Perspectives of Young People
	Segregation and Differentiation: City-Suburb Contrasts
Gaulley Tunnel Community Impact Project	
The Emerging Pattern of American Ethnicity	Industrial Urbanism and the Development of Ethnicity
	Ethnicity and Change
Aged Americans: Survey of a Minority Group	Processes of Social Change in Kinship and Family Structure
Daytime Serials and the World View of Blue Collar Wives	Preschool Children's Television Viewing Behavior
A Dictionary of Regional American English	The Decreolization of Gullah: A Case Study of Linguistic Socialization
Regional and Social Dialects of North Carolina	Native American Languages of Oregon
Archaeological Studies of Native Civilizations of North America	Archaeology of the Alaska Peninsula
Planning Grant to the Board of Human Resources, National Academy of Sciences	
Planning Grant to National Research Council's Survey of Earned Doctorates, National Academy of Sciences	

[1] Data on NEH from Eighth Annual Report of the National Endowment for the Humanities, Fiscal Year 1973, passim; and Humanistically Oriented Sociology Projects Supported by NEH. ASA Footnotes, February 1975: 3, 5. Data on NSF from National Science Foundation. Division of Social Sciences Grant List, fiscal year 1975. 25 p.

In view of the apparent duplication of effort, at least as indicated by project titles, it may be necessary to inquire further into the similarities and differences between support priorities for these agencies.

N. A RECAPITULATION AND CONCLUDING OBSERVATIONS ON THE ROLE OF THE NSF IN SUPPORTING PSYCHOLOGICAL AND SOCIAL RESEARCH

The information presented in this section indicates that the National Science Foundation plays an extremely important role in supporting basic and applied psychological and social research, especially in academic institutions. For instance, in the fiscal year 1975, 58 percent of NSF expenditures for basic and applied social and psychological sciences research went to academic institutions. NSF expenditures for basic social sciences during the fiscal year 1975 constituted 44 percent of all Federal basic research expenditures for these sciences in universities and colleges. The importance of the Foundation's role is evidenced especially in those disciplines where it provides about 50 percent or more of Federal basic research funds: political science, anthropology, history, and linguistics.

The Foundation's research support role, however, seems to have been constrained by a static or diminishing supply of funds to support these fields. Psychology and social sciences have consistently been the least successful of all fields of science supported in terms of numbers of awards made in relation to the number of proposals submitted, and the amount of grant funds awarded in relation to the dollar amounts requested. NSF's role as a supporter of basic and non-problem-oriented applied social research also seems to have diminished since inception of the RANN program. Before the establishment of RANN, applied and basic psychological and social sciences research received about 10 percent of total NSF research funds allocated annually. In the fiscal year 1976 it was estimated that only 5 percent of NSF's budget would go to support these types of research. When assessed in terms of dollar support, NSF awards for these areas have increased by one-third since 1966 in current dollars. In terms of real dollars, these sums decreased by about 15 percent. These patterns are significant in themselves, but especially important when compared to the doubling in the number of academic social and behavioral sciences that has taken place since 1965.

Although the Congress gave the Foundation an explicit mandate in 1968 to support social sciences, some criticism about the Foundation's projects in these disciplines continues. The rationale of these criticisms is similar to that expressed in 1950 when the Congress decided not to permit the Foundation to support these sciences explicitly, i.e., projects are frivolous, nonscientific, and a waste of taxpayers' money since at times their findings are no different from those demonstrated by commonsense.

Several internal management issues were discussed. It was noted that the Foundation's support programs for the psychological and social sciences might be better justified and understood if the agency improved efforts to articulate its program objectives. There is considerable evidence to indicate that the Foundation has established priorities for its programs and that it prepares internal documents which are used to justify program support for what some critics label as seemingly frivolous or "one-shot" projects. General priorities expressed in public documents indicate that NSF is interested in funding studies which advance the methodology of the social sciences and which generate cumulative advances in the disciplines supported. Insufficient effort is made in NSF's public documents especially in annual reports and budget submissions, to explain these priorities and annual programmatic support plans in terms of these priorities. Special attention appears warranted to identify the rationale and funding patterns for continuing awards, student training, equipment, development of data bases, and institutional support programs.

Data on the Foundation's psychology and social sciences support programs also indicate that awards are concentrated in a few schools. There is some evidence, but as yet inconclusive, to indicate that NSF's top recipients may not always be the best performers in terms of research output and quality of institution when judged in terms of expected excellence in research and teaching. Further attention might be given to assessing these patterns.

It was noted that the Foundation does not appear to have advisory panels for many discipline areas supported and that existing panel review mechanisms may not always be adequate. Also, there is no clear information to indicate that the Foundation has used proper systematic procedures to consult outside professionals when establishing new program emphases or when funding cumulatively large continuing awards for specific areas, such as social indicators, management facilities, and development of data bases. Another management issue concerns the appropriate mix between quantitatively oriented basic research studies and other types of basic research studies which do not use quantitative methods, such as case studies, normative studies, and institutional studies. Some social scientists have also faulted the NSF for using the methodological criteria of the physical and natural sciences when assessing proposals for the psychological and social sciences, sciences whose findings cannot be measured as precisely as those of the natural and physical sciences. Others note that the development of some disciplines and the accumulation of understanding about the policy implications of some areas of inquiry are thwarted by lack of attention to research on the questions of norms, values, and institutions of social behavior.

Questions have also been raised about whether NSF support projects may overlap those of other agencies. Areas for possible inquiry were identified, especially for support programs in psychology, economics, sociology, and interdisciplinary projects.

Despite some recent recommendations that NSF use social utility criteria in funding basic research, it was noted that other studies indicate that the nature of scientific research usually prevents the Foundation from preprogramming basic research priorities. Nevertheless the Foundation does seem to have a responsibility to better articulate and report the priorities and the findings of research it funds in order to justify programs to the Congress and to assist researchers, other agencies and managers in identifying lagging or promising areas of research.

IV. PROBLEM-ORIENTED APPLIED SOCIAL RESEARCH IN THE PROGRAM OF RESEARCH APPLIED TO NATIONAL NEEDS

As noted above in chapter II, the Foundation's programs for the support of problem-oriented applied social research began with the formation of the Research Applied to National Needs program (RANN). This program has continued to receive increasing levels of funding. During the fiscal year 1976 the Congress authorized the Foundation to allocate a minimum of $23 million for such research, a significant proportion of the Foundation's total budget for psychological and social sciences research. Issues have been raised regarding the management of the program and the quality and use of the products generated.

This section describes the formation of the Research Applied to National Needs program (RANN), summarizes the objectives of RANN's applied, problem-oriented social research support programs, and overviews some issues of management, priorities, coordination, and utilization, which may warrant additional attention.

A. ORIGIN OF RANN AND AN INTRODUCTION TO ITS MISSION

Public Law 90–407 of 1968, as noted in more detail in chapter II, amended the National Science Foundation's enabling act by giving the agency explicit responsibilities to support applied research as well as social sciences research. The legislative authorization for applied research, which formed the basis for the Research Applied to National Needs program (RANN), gave the Foundation authority to conduct "applied research relevant to national problems involving the public interest." [132]

Under this new authority, the NSF established the Office of Interdisciplinary Research Related to Problems of Society (IRRPOS) in the fiscal year 1970. This office supported interdisciplinary research related to the environment, energy, waste products and fire research. During the fiscal year 1971, the Foundation established a Directorate for Research Applications. The Research Applications Directorate, which administers the RANN program, assumed the responsibilities of the former IRRPOS program and some of the other problem-oriented basic NSF research which had been supported in the Research Directorate. This included earthquake engineering and weather modification.

The general objectives of the RANN program are:

To increase the use of science and technology in solving selected national problems;

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[132] Sec. 3c of the National Science Foundation Act of 1950, Public Law 81–507, as amended.

To increase utilization of the national investment in scientific resources;

To shorten leadtimes between basic national problems and relevant applications; and

To provide early warning of potential national problems and initiate research useful in avoiding or solving such problems.[133]

It is the intention of the RANN program to fund only those projects which fall outside the responsibilities of other agencies or which span the responsibilities of several agencies. Also, when research under RANN is ready for development or application, the project is passed along to the Federal agency responsible for such development and application. RANN program management differs considerably in the following respects from management in the Division of Social Sciences and other sections of the Foundation which support basic and applied scientific research projects: RANN's problem-oriented research priorities are carefully established; much of the research is interdisciplinary; the research is closely managed by the Foundation in an attempt to engage potential users in problem formulation and research verification; and RANN research proposals must set forth clearly expected plans for dissemination and utilization of research results.

The Foundation maintains that research supported under the RANN program must meet one or more of the following four criteria:

Problems falling between or outside areas of responsibility of other agencies;

Problems spanning the areas of responsibility of other agencies;

Problems related to meeting the longer range and special needs of other agencies; and

Problems particularly suited to solution by multidisciplinary research teams in universities, industry, national laboratories, and not-for-profit organizations.[134]

B. RANN'S ORGANIZATION STRUCTURE

From its inception until the fiscal year 1973, RANN consisted of four separate subject divisions: Social Systems and Human Resources, Environmental Systems and Resources, Advanced Technology Applications, and Exploratory Research and Problem Assessment. During the fiscal year 1974 a separate program was created on Advanced Energy Research and Technology.

The responsibilities of the divisions in the fiscal year 1974 were as follows: Social Systems and Human Resources: research concerning the changing structure of society and human resources and for improving social systems; Advanced Technology Applications: development of a knowledge base for new or improved technologies and their practical application; Environmental Systems and Resources: research for effective development of land and natural resources, while improving environmental quality. Exploratory Research and Problem Assessment: exploratory research to determine which national problems are amenable to solution through science and engineering capabilities and technology assessment; and Advanced Energy Research and Technology: alternative energy sources and methods of energy conversion, storage, and transmission.[135]

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[133] U.S. Congress. House. Committee on Science and Technology. Authorizing Appropriations to the National Science Foundation. House Report No. 94–66. Mar. 14, 1975. 94th. Congress. 1st session. Washington, U.S. Government Printing Office, 1975. p. 76.

[134] Authorizing Appropriations to the National Science Foundation, H. Rep. 94–66. op. op. cit., p. 77. Emphasis in original.

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[135] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 127.

Table 27 A

RANN, Program Activity and Obligations, Actual Obligations, Fiscal Year 1974; Estimated Obligations, Fiscal Years 1975 and 1976 1/

FY 1976 PROGRAM ACTIVITY & ESTIMATED OBLIGATIONS

(Dollars in thousands)

		Energy					
FY 1974 Program Activity	Actual FY 1974	Energy Resources		Energy Conversion Storage & Transportation		Energy Systems	
		FY 75	FY 76	FY 75	FY 76	FY 75	FY 76
Energy	28,111						
Solar Energy....................	14,819	10,000	6,000				
Geothermal Energy................	3,618	6,000	4,000				
Energy Conversion and Storage.....	3,148			10,700	3,700		
Energy Systems....................	3,472					4,700	3,000
Energy Resources..................	774	3,800	3,800				
Advanced Automotive Propulsion....	576			900	800		
Energy and Fuel Transportation....	1,704			1,000	700		
Environmental Systems and Resources	17,171						
Environmental Effects of Energy...	1,000						
Regional Environmental Systems....	6,723						
Weather Modification..............	3,731						
Environmental Aspects of Trace Contaminants..................	5,717						

Table 27 A (continued)

Advanced Technology Applications...	15,595						
Disasters and Natural Hazards....	9,630						
Technological Opportunities......	5,965						
Social Systems and Human Resources.	10,401						
Municipal Systems and Services...	8,574						
Human Resources and Services.....	405						
Social Data and Evaluation.......	584						
Public Regulation and Economic Productivity..................	838						
Exploratory Research and Problem Assessment....................	3,801						
Technological Assessment.........	1,117						
Selective Research Topics........	1,999						
New Problems and Projects........	685						
Totals........................	75,079	19,800	13,800	12,600	5,200	4,700	3,000

1/ NSF. Fiscal Year 1976 Budget to the Congress, op. cit., p. F-7.

Table 27 A (continued)

Environment				Productivity						Exploratory Research and Problem Assessment			
Managing the Natural Environment		Disasters & Natural Hazards		Public Technology		Public Policy & Economic Productivity		Public Policy & Human Resources		Technology Assessment		Exploratory Research & Technological Opportunities	
FY 75	FY 76	FY 75	FY 76	FY 75	FY 76	FY 75	FY 76	FY 75	FY 76	FY 75	FY 76	FY 75	FY 76
1,200	1,300												
5,835	6,700											1,700	3,500
		3,900	4,900										
4,775	5,800												

Table 27 A (continued)

		6,400	8,300										
				2,100	3,200							4,000	5,000
				5,300	5,200	5,000	6,500						
						1,500	2,800						
										1,400	2,000		
								1,000	2,300			1,500	-0-
11,810	13,800	10,300	13,200	7,400	8,400	6,500	9,300	1,000	2,300	1,400	2,000	7,200	8,500

During the fiscal year 1975, on August 24, 1974, RANN was reorganized. The programs of the Social Systems and Human Resources Division were restructured into the Advanced Productivity Research and Technology Division.

This office also assumed some of the responsibilities of the Office of Exploratory Research and Problem Assessment. The Advanced Technology Applications Division was terminated and its former functions were divided between the Environment and Productivity Divisions. (See table 27A.) Also, the Office of Intergovernmental Science and Research Utilization was given added responsibilities to review the utilization plans of all RANN projects which requested at least $150,000 in funding to insure that users participate in program planning.[136]

During the fiscal year 1976 further changes occurred in the RANN structure. The energy section was restructured into the resources section; and parts of the exploratory research and technological opportunities program of the section on exploratory research and problem assessment were terminated. (See table 27B.)

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[136] Opportunities for Improved Management of the Research Applied to National Needs (RANN) program, op. cit., p. 127.

Table 27 B

RANN, Program Activity and Obligations, Actual Obligations, Fiscal Year 1975; Estimated Obligations, Fiscal Years 1976 and 1977 1/

(Dollars in Millions)

FY 1976 PROGRAM ACTIVITY	Actual FY 1975	RESOURCES					
		Resource Systems		Renewable		Nonrenewable	
		76	77	76	77	76	77
ENERGY	$35,890						
Energy Resources (Solar Geothermal, Fossil)	19,987			3.4		2.5	
Energy Conversion, Storage, and Transportation	11,602			.3		1.4	
Energy Systems	4,301	1.5					
ENVIRONMENT	23,756						
Managing the Natural Environment	13,579						
Disasters and Natural Hazards	10,179						
PRODUCTIVITY	14,906						
Public Sector Technology	7,906						
Public Policy and Economic Productivity	4,608						
Public Policy and Human Resources	2,390						
EXPLORATORY RESEARCH AND PROBLEM ASSESSMENT	6,199						
Technology Assessment	1,211						
Exploratory Research and Technological Opportunities	4,988	2.9	3.0	1.7	4.5	2.5	2.5
INTERGOVERNMENTAL SCIENCE & RESEARCH UTILIZATION	2,837						
Intergovernmental Science	1,003						
Experimental R&D Incentives	1,834						
TOTALS	$83,590	4.4	3.0	5.4	4.5	6.4	2.5

1/ National Science Foundation. Fiscal Year 1977 Budget to the Congress, p.

Table 27 B (continued)

ENVIRONMENT				PRODUCTIVITY						EXPLORATORY RESEARCH & TECHNOLOGY ASSESSMENT		INTERGOVERNMENTAL SCIENCE & RDI				TOTALS	
Managing the Natural Environment		Disaster & Natural Hazards		Public Sector		Public Policy		Private Sector		Technology Assessment		Inter-governmental		Industrial		Total	
76	77	76	77	76	77	76	77	76	77	76	77	76	77	76	77	76	77
																5.9	
																1.7	
																1.5	
13.2	12.0															13.2	12.0
		13.8	12.5													13.8	12.
				6.4	6.4	1.0	.7	1.8	1.0							9.2	8.1

Table 27 B (continued)

				3.0	3.0	5.5	5.9	0.3	0.9							8.8	9.8
						4.0	3.9									4.0	3.9
										1.4	1.4					1.4	1.4
								2.5	2.6							9.6	12.6
												2.5	3.6			2.5	3.6
												1.0		1.0	1.0	2.0	1.0
13.2	12.0	13.8	12.5	9.4	9.4	10.5	10.5	4.6	4.5	1.4	1.4	3.5	3.6	1.0	1.0	73.6	64.9

C. THE CONSISTENT INCREASE IN FUNDING FOR RANN PROBLEM-ORIENTED SOCIAL RESEARCH

Most of the social research in the RANN program has been supported by first, the Division of Social Systems and Human Resources, and then, by the Advanced Productivity Research and Technology Division. However, other divisions have also supported social research. Social science research in RANN has evidenced a consistent increase in funding, from about $7 million in the fiscal year 1971 to $20 million in the fiscal year 1975. (See table 28.) (As noted above these figures are imprecise because staff use different reporting systems from year to year; interdisciplinary RANN social research is not always consistently reported to the Congress and different definitions or research areas are encompassed in the *Federal Funds* category for reporting RANN social research i.e. Social Sciences, NEC.) Estimates of such expenditures for 1976 varied. However, in acting on the fiscal year 1976 NSF budget, the Congress requested that RANN allocate a minimum of $23 million for applied social research and policy research, lowered subsequently to $19.5 million by Appropriations Act cuts. The need for this increase—to assist in solving urban, municipal, welfare, general growth, and productivity problems—was explained in the House report on the NSF authorization:

TABLE 28.—ESTIMATES AND EXTRAPOLATIONS OF THE BUDGETS OF RANN PROGRAMS WHICH SUPPORT A SUBSTANTIAL AMOUNT OF APPLIED SOCIAL RESEARCH, BY PROGRAM ACTIVITY, FISCAL YEARS 1971-76, ESTIMATED

Division and programs	Fiscal years—					
	[1] 1971	[2] 1972	[3] 1973	[4] 1974	1975 estimate [5]	1976 estimate [5]
Social Systems and Human Resources	$7,101,785	$11,284,202	$13,352,323	$13,201,000	$19,750,000	$29,800,000
Municipal Systems and Services	1,601,322	7,706,099	7,861,195	8,574,000		
Social Data and Community Structure	5,500,463					
Human Resources and Services		2,791,803	4,253,828	405,000		
Social Data Evaluation		786,300	1,237,300	584,000		
Public Regulation and Economic Productivity				838,000		
Advanced Productivity Research and Technology					12,850,000	17,650,000
Public Sector Technology					5,350,000	6,050,000
Advanced Urban Technology					1,150,000	1,450,000
Excavation Technology					400,000	600,000
Instrumentation Technology					500,000	700,000
Communication Technology and Public Services					3,300,000	3,300,000
Public Policy and Economic Productivity					6,500,000	9,300,000
Productivity Measurement					2,000,000	2,800,000
Service Productivity and Intergovernmental Structure					3,000,000	3,200,000
Economic Productivity					1,500,000	2,800,000
Problems of Post-Industrial Economy					0	500,000
Public Policy and Human Resources					1,000,000	2,300,000
Public Policy and Disadvantaged					500,000	1,000,000
Consumer Market Policy					500,000	1,300,000
Environmental Research and Technology				2,800,000	3,300,000	4,150,000
Regional Environmental Management (50 percent of the program)				2,800,000	2,900,000	3,350,000
Social Impact of Natural Hazards and Disasters				0	400,000	800,000

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[1] National Science Foundation. Justification of estimates of appropriations, salaries, and expenses, special foreign currency program, fiscal year 1973 to the Congress. p. I-III-1.

[2] Ibid., pp. H-III-1.

[3] National Science Foundation. Justification of estimates of appropriations, salaries, and expenses, special foreign currency program, fiscal year 1975 to the Congress. p. G-IV-1.

National Science Foundation. Justification of estimates of appropriations, salaries, and expenses, special foreign currency program, fiscal year 1976 to the Congress. p. F-7.

[5] Ibid., p. F-III-4, F-III-10, F-III-7, F-II, and F-II-9. Some extrapolations are based on estimates provided by NSF staff.

The Committee has followed with interest the efforts of the NSF within the RANN program to increase the relevance and applicability of the social sciences in meeting national needs. This work involves research in the fields of applied social sciences and the policy sciences. For the coming fiscal year it was concluded that a modest increase in this work would be in order and hence a fifteen percent increase over the proposed $20 million effort was included in the bill bringing the total of such work in the RANN program to $23 million.

The Committee intends that this applied social research and policy-sciences research focus on the promotion of effectiveness, efficiency and the removal of waste from social policies and programs at the Federal, State and local government levels. The Committee further intends that the particular policies and programs should now address, but not be limited to, such problems as how to make urban systems work; how to encourage initiative and productivity in the U.S. Civil Service; how to help many poor people escape from a tradition of three and four generations of welfare into productive and dignified employment; how to design urban housing complexes that protect both their inhabitants, and those of the community in which they are placed, and crime as well as generally, how to design public-safety systems that measurably protect citizens from violence; how to improve regional decision-making; and how to balance growth, development and the quality of life.[137]

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[137] Authorizing Appropriations to the National Science Foundation, H. Rep. 94-66, op. cit., pp. 145-146.

TABLE 29.—RANN AWARDS FOR SOCIAL SCIENCE RESEARCH, FISCAL YEAR 1975, BY PROGRAM, PERFORMER, SUBJECT, AND DOLLAR AMOUNT [1]

Programs	Sociology			Social sciences (NEC)			Psychology- Social aspects			Anthropology			Economics		
	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded
Research Applications Directorate:															
International travel program				2		2,584									
Total				2		2,584									
Office of Exploratory Research and Problem Assessment:															
Congressional working fund:															
Federal Energy Administration															
Technology assessment															
Problem assessment and exploratory research	1	1	5,500	12	5	682,300				1	1	279,800	2	2	105,400
Total	1	1	5,500	12	5	682,300				1	1	279,800	2	2	105,400
Advanced Environmental Research and Technology:															
Congressional working fund															
Department of Interior															
Social impact of natural disasters and hazards													1	1	148,850
Earthquake engineering				1	1	114,100									
Fire research															
Weather modification															
Pollutant analysis															
Regional environmental management															
Coastal zone management															
Land use management															
Management of rural/urban environment															
Environmental aspects of trace contaminants															
Environmental effects of energy															
Ecological effects															
R. & D.—Environmental Protection Agency															
Reimbursable appropriation															
Total				1	1	114,100							1	1	148,850

Advanced Productivity Research and Technology:															
Congressional working fund:															
Maritime															
Department of Labor															
Enzyme technology															
Instrumentation technology															
Production research and technology															
Processes (extractive metallurgy)															
Excavation technology													1	1	69, 100
Municipal systems and services															
Social data and evaluation				1		110, 133									
Regulation and economic productivity				1	1	19, 950							5	3	454, 300
Improving use of existing resources				3	1	86, 100	1		29, 400				3	1	263, 130
Evaluating attract. applic.—Urban technology				11	4	1, 086, 500	2	2	285, 000				6	5	2, 253, 666
Evaluating alt. Federal, State, and local mechanisms—Urban				5	4	187, 500							15	7	1, 502, 723
Productivity of service and delivery organization	1	1	54, 600	4	2	145, 172							2	1	260, 400
Human services and the law															
Heating and cooling of buildings															
Reimbursable appropriations															
Fiscal year 1975 projects													1	1	50, 000
Total	1	1	54, 600	25	12	1, 635, 355	3	2	579, 400				35	19	4, 853, 319
Office of Intergovernmental Science and Research:															
Reimbursable appropriation															
State government science assistance															
Local government science assistance				1		30, 000									
Research utilization activities				1		8, 000									
Legislative body as assistance													1		10, 000
Total				2		38, 000							1		10, 000

See footnote at end of table.

TABLE 29.—RANN AWARDS FOR SOCIAL SCIENCE RESEARCH, FISCAL YEAR 1975, BY PROGRAM, PERFORMER, SUBJECT, AND DOLLAR AMOUNT[1]—Continued

Programs	Sociology			Social sciences (NEC)			Psychology—Social aspects			Anthropology			Economics		
	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded
Advanced Energy and Technology:															
Fiscal year 1975 projects															
Bioconversion															
Consolidated working fund:															
Federal Energy Administration															
Heating and cooling of buildings													3	2	288,700
Solar energy															
Heating and cooling of buildings															
Solar thermal conversion				1		49,600									
Photovoltaic conversion															
Bioconversion to fuel															
Wind energy															
Ocean thermal													1	1	122,000
Geothermal energy															
Resource exploration and assessment															
Environmental, legal, and institutional research													1	1	205,900
Advanced research and technology															
Total				1		49,600							6	4	696,600
Office of Systems Integration and Analysis:															
Chemical process															
Fiscal year 1975 projects															
Energy systems				1	2	99,500							13	9	1,187,800
Reimbursable appropriation															
Total				1	2	99,500							13	9	884,000

Advanced Energy Research and Technology:															
Energy conversion															
Energy resources															
Energy and fuel transportation															
Advanced automotive propulsion															
Energy storage															
Office of Experimental R. & D. Incentives:															
Experimental R. & D. incentive programs															
Private sector utilization															
Incentive evaluation															
Public sector utilization				1		46,000									
Incentive evaluation															
Total				1		46,000									
Grand total	2	2	60,100	45	20	2,667,439	3	2	579,400		1	279,800	58	35	6,698,219
Research Applications Directorate:															
International travel program										1		2,000			
Total										1		2,000			
Office of Exploratory Research and Problem Assessment:															
Congressional working fund:															
Federal Energy Administration															
Technology assessment															
Problem assessment and exploratory research	1		169,600	1	1	10,000				6	1	413,400			
Total	1		169,600	1	1	10,000				6	1	413,400			
Advanced Environmental Research and Technology:															
Congressional working fund															
Department of the Interior															
Social impact of natural disasters and hazards										3	2	147,150			
Earthquake engineering															
Fire research										1		37,000			

See footnote at end of table.

TABLE 29.—RANN AWARDS FOR SOCIAL SCIENCE RESEARCH, FISCAL YEAR 1975, BY PROGRAM, PERFORMER, SUBJECT, AND DOLLAR AMOUNT [1]—Continued

Programs	Sociology			Social sciences (NEC)			Psychology—Social aspects			Anthropology			Economics		
	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to versties	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded
Weather modification										1	1	33,500			
Pollutant analysis										1	1	41,800			
Regional environmental management										1	1	178,500			
Coastal zone management										1	1	328,200			
Land use management															
Management of rural/urban environment															
Environmental aspects of trace contaminants															
Environmental effects of energy										2		128,112			
Ecological effects										1		3,225			
R. & D.—Environmental Protection Agency															
Reimbursable appropriation															
Total										11	6	893,487			
Advanced Productivity Research and Technology:															
Congressional working fund:															
Maritime															
Department of Labor												24,000			
Enzyme technology															
Instrumentation technology															
Production research and technology															
Processes (extractive metallurgy)															
Excavation technology										2		19,211			
Municipal systems and services	1		43,300												
Social data and evaluation															
Regulation and economic productivity				1		66,000				1		100,800			
Improving use of existing resources				1		10,000									

Evaluating attract. applic.—Urban technology	1	1	49,450							4	2	458,599	2		85,600
Evaluating alt. Federal, State, and local mechanisms—Urban	4	4	348,300	1	1	63,100	1	1	276,400						
Productivity of service and delivery organization										1	1	98,000			
Human services and the law				5	2	543,667									
Heating and cooling of buildings															
Reimbursable appropriations															
Fiscal year 1975 projects										1	1	50,000			
Total	6	5	397,750	8	3	682,767	1	1	276,400	10	4	751,510	2		85,600
Office of Intergovernmental Science and Research:															
Reimbursable appropriation										5		157,000			
State government science assistance	1		5,000				1		45,000	7		193,710			
Local government science assistance							3		245,000	1		15,000			
Research utilization activities	1		10,000				1		32,000						
Legislative body as assistance							1		25,000	4		133,400			
Total	2		15,000				6		347,000	17		639,110			
Advanced Energy Research and Technology:															
Fiscal year 1975 projects															
Bioconversion															
Construction working fund:															
Federal Energy Administration															
Heating and cooling of buildings															
Solar energy															
Heating and cooling of buildings															
Solar thermal conversion															
Photovoltaic conversion															
Bioconversion to fuel															
Wind energy															
Ocean thermal				1		60,700				1		90,000			
Geothermal energy				1	1	165,900									
Resource exploration and assessment															

See footnote at end of table.

TABLE 29.—RANN AWARDS FOR SOCIAL SCIENCE RESEARCH, FISCAL YEAR 1975, BY PROGRAM, PERFORMER, SUBJECT, AND DOLLAR AMOUNT [1]—Continued

Programs	Sociology			Social sciences (NEC)			Psychology—Social aspect			Anthropology			Economics		
	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded	Total awards	Awards to universities	Funds awarded
Environmental, legal, and institutional research															
Advanced research and technology															
Total				2	1	226, 600				1		90, 000			
Office of Systems Integration and Analysis:															
Chemical process															
Fiscal year 1975 projects															
Energy systems				1		166, 066	1	1	37, 500	1		50, 000			
Reimbursable appropriation															
Total				1		166, 066	1	1	37, 500	1		50, 000			
Advanced Energy Research and Technology:															
Energy conversion															
Energy resources															
Energy and fuel transportation															
Advanced automotive propulsion															
Energy storage															
Office of Experimental R. & D. Incentives:															
Experimental R. & D. incentive programs				1		37, 000	1		31, 123	2	2	224, 000			
Private sector utilization							1	2	692, 023						
Incentives evaluation															
Public sector utilization										2		105, 000			
Incentives evaluation										2	1	224, 700			
Total				1		37, 000	1		31, 123	6	3	553, 700			
Grand total	9	5	582, 350	13	15	1, 122, 433	9	2	692, 023	53	14	3, 393, 207	2		85, 600

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[1] Computed from: U.S. National Science Foundation. Fiscal Year 1975 awards by program-subprogram through June 30, 1975 (preliminary year-end report), Research Applications Directorate [including] Research Applied to National Needs (RANN), Intergovernmental Science, and Research and Development.

Note: Total dollars awarded=$16,159,571; total number of awards for social sciences fields=195; total number of awards to universities for social sciences fields=86; total dollars awarded by Research Applications Directorate=$85,275,056; total number of awards=779.

D. SOCIAL PROBLEM-ORIENTED RESEARCH FUNDING BY DISCIPLINE AND RANN PROGRAM AREAS IN THE FISCAL YEAR 1975

Data arranged in table 29 indicate that all fields of social sciences were supported. Total funds awarded during the fiscal year 1975 for social problem-oriented research were $16,159,571 or about 19 percent of the Research Applications Directorate's total funding. The largest share of social sciences funding was for economics research (41 percent of the total). Other disciplines supported, in decreasing order of amount of funding were other sciences, NEC [not elsewhere classified] (including management studies and other interdisciplinary social research); social sciences, NEC; law; science policy; psychology—social aspects; political science; anthropology; computer sciences; and sociology. The Advanced Productivity Research and Technology Division supported the largest share of social sciences research, about half of the total for these fields in RANN. Other RANN Divisions provided about evenly distributed support for the other half. Of the awards made, 86, or 44 percent, went to university performers. (For a summary, see table 30.)

TABLE 30.—RESEARCH APPLICATIONS DIRECTORATE FUNDING, FISCAL YEAR 1975 SOCIAL SCIENCES PROJECTS, A SUMMARY OF DATA[1]

	Sociology	Social sciences (NEC)	Psychology—social aspects	Anthropology	Economics	Political science	Law	Science policy	Other sciences (NEC)	Computer science
International Travel Program:										
Dollar amount		2,584							2,000	
Number of awards		2							1	
Number of awards to universities										
Office of Exploratory Research and Problem Assessment:										
Dollar amount	5,500	682,300		279,800	105,400	169,600	10,000		413,400	
Number of awards	1	12		1	2	1	1		6	
Number of awards to universities	1	5		1	2		1		1	
Advanced Environmental Research and Technology:										
Dollar amount		114,100			148,500				893,487	
Number of awards		1			1				11	
Number of awards to universities		1			1				6	
Advanced Productivity Research and Technology:										
Dollar amount	54,700	1,635,355	579,400		4,853,319	397,750	682,767	276,400	751,510	85,600
Number of awards	1	25	3		35	6	8	1	10	2
Number of awards to universities	1	12	2		19	5	3	1	4	
Office of Intergovernmental Science and Research:										
Dollar amount		38,000			10,000	15,000		347,000	639,110	
Number of awards		2			1	2		6	17	
Number of awards to universities					1					
Advanced Energy Research and Technology:										
Dollar amount		48,600			696,600		226,600		90,000	
Number of awards		1			6		2		1	
Number of awards to universities					4		1			
Office of Systems Integration and Analysis:										
Dollar amount		99,500			884,400		166,066	37,500	50,000	
Number of awards		2			13		1	1	1	
Number of awards to universities		1			9			1		
Office of Experimental R. & D. Incentives:										
Dollar amount		46,000					37,000	31,123	553,700	
Number of awards		1					1	1		
Number of awards to universities										
Total:										
Total dollar amount	60,100	2,666,439	579,400	279,800	6,698,219	582,350	1,122,433	692,023	3,393,207	85,600
Number of awards	2	45	3	1	58	9	13	9	53	2
Number of awards to universities	2	20	2	1	35	5	5	2	14	
Total dollars each area as a percent of total social sciences	0.4	16.5	3.6	1.7	41.5	3.6	6.9	4.3	21.0	0.5
Total dollars social sciences	16,159,571									
Total dollars for social sciences as a percent of total RANN	18.9									

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[1] Summarized from data in table 29.

E. OBJECTIVES OF THE SOCIAL PROBLEM-ORIENTED SUPPORT PROBLEMS

During its first three years, the Social Systems and Human Resources Division concentrated on three types of programs: (1) municipal systems, operations, and services, (2) social data and community structure (later called human resources and services), and (3) social program evaluation methodology. In the fiscal year 1975, the Division began to support projects in public regulation and economic productivity.

The social sciences programs proposed for the Productivity Division for the fiscal year 1976 were:

- (1) **Public Sector Technology:**
  - a. **Advanced Urban Technology.**
  - b. **Excavation Technology.**
  - c. **Instrumentation Technology.**
  - d. **Communications Technology and Public Services.**
- (2) **Public Policy and Economic Productivity Program:**
  - a. **Productivity Measurements.**
  - b. **Service Productivity and Intergovernmental Structure.**
  - c. **Regulation and Economic Productivity.**
  - d. **Problems of the Post-Industrial Economy.**
- (3) **Public Policy and Human Resources:**
  - a. **Public Policy and the Disadvantaged.**
  - b. **Consumer Policy.**

The public sector technology program is designed to assess and encourage the development of selected technologies used in delivering public services and to provide decisionmakers with information about the cost-effectiveness of the technologies. Research focuses on technological barriers, economic incentives and on those legal, economic, social, and organizational factors at all governmental levels which must be understood before the technology can be adopted effectively.

The public sector technology fiscal year 1976 budget emphasized the following technologies: health service delivery, refuse collection, street cleaning, fire protection, computer services, and administration and excavation technologies for transportation and utility systems.[138]

The public policy and economic productivity program focuses on social problems and consists primarily of social science research. The objective is to improve the management and efficiency of governmental performance at all levels. Research deals with the development of incentives for efficiency and productivity and study of the resources needed by governmental organizations to provide information required to enhance productivity. A new program element—problems of the postindustrial economy—was added in the fiscal year 1976 budget. Its objectives are to assess the economic, social and political implications of development of a service-oriented economy. Research is intended deal with factors such as the requirements of a knowledge-based industrial system, the demand for improving the quality of life, development of corporate social responsibility, and institutional barriers to job opportunity and mobility.[139]

Like the public policy and economic productivity program, the public policy and human resources program consists entirely of applied social research designed to provide decisionmakers with information and techniques to help solve major social problems and social services delivery issues. Research deals, for instance, with the distributional and equity issues raised by increases in the number of aged and dependent persons and minority groups. The consumer productivity program focuses on human and technological issues in markets for goods and services, such as product-related injuries and improving the quality of consumer information.[140]

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[138] Authorizing Appropriations to the National Science Foundation, H. Rep. 94-66, op. cit., pp. 90-91.

[139] Ibid., pp. 95-96.

F. CONGRESSIONAL CRITICISMS OF RANN'S SOCIAL RESEARCH PRIORITIES

The General Accounting Office has completed a report assessing questions of management and priorities in RANN.[141] In addition, some Members of the House and Senate Appropriations Committees have criticized the RANN social problem-oriented applied research programs. Some of these criticisms, especially those relevant to legislative oversight of the RANN social research programs, are addressed below.

1. Overlap or Duplication With Other Agencies.—One of the major criticisms of RANN research in general, and RANN social research in particular, is that some of the projects might be funded more appropriately by other Federal agencies. For instance, in discussing the Foundation's fiscal year 1976 budget for RANN social problem-oriented research, Mr. Shipley of the House Appropriations Committee said:

> You have a new activity for $500,000 proposed to investigate problems of post-industrial economy, $1 million is requested to analyze public policy and the disadvantaged, and $1.3 million to develop information on consumer market policy.
>
> Many of us sitting on this side of the table and on other subcommittees find that it is very difficult to go into those areas of programs of the National Science Foundation, and not feel that they duplicate what is being done or should be done in the mission agencies.
>
> I personally feel that there certainly is duplication. Some of the areas that you have here should be turned over to HUD or to HEW.[142]

Criticism has been directed at specific RANN projects, for example: overlap in RANN programs on advanced urban technology and computer software for municipal governments with the Department of Housing and Urban Development;[143] possible duplication between the RANN program and HUD in studying the behavioral implications of building design;[144] duplication in studying the implementation and implications of revenue sharing with the General Accounting Office, the Congressional Budget Office, the Department of the Treasury and the Council of Economic Advisers;[145] overlap with the Federal Communications Commission in studying television network regulations;[146] and possible overlap with the Law Enforcement Assistance Administration on a variety of studies, including research in improving policy patrol service systems,[147] crime reduction and community stability,[148] and an evaluation of policy research in law enforcement.[149]

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[140] Ibid., pp. 97–98.

[141] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit.

[142] U.S. Congress. House. Department of Housing and Urban Development-Independent Agencies Appropriations for 1976. Hearings before a Subcommittee of the Committee on Appropriations. Part 1, National Science Foundation, 94th Congress, 1st session. Washington, U.S. Government Printing Office, 1975. p. 622.

[143] Ibid., p. 614.

[144] U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies Appropriations for Fiscal Year 1975. Hearings. Part 2, 93d Congress, 2d session on H.R. 15572. Washington, U.S. Government Printing Office, 1974. p. 859.

[145] Department of Housing and Urban Development, and Certain Independent Agencies Appropriations, Fiscal Year 1976, Senate, Hearings, op. cit., pp. 38–39.

For instance, in the fiscal year 1976 Senate Appropriations hearings, Senator Proxmire said:

> In your statement, Dr. Stever, you referred to a RANN program to evaluate law enforcement research.
>
> Under the terms of the Crime Control Act of 1970, the Law Enforcement Assistance Administration has been required to undertake a major program of evaluation with respect to experimentation in the criminal justice system. Furthermore, LEAA has a National Institute for Law Enforcement and Criminal Justice which was budgeted over $45 million in fiscal year 197[illegible]. This is more than half of the $82.7 million for all NSF RANN research in fiscal year 1975. That is why I am wondering why you get involved in the area.
>
> You have, for example, a comparative study of the disposition of felony cases, $168,900; decriminalized law enforcement, $62,400; evaluating the organization of service delivery—policy, $548,000. I have been critical of LEAA because of what they have failed to do. They spent all this money and then they failed to find out what works and what does not. That is their job; that is what they should do.[150]

The Foundation has given a variety of responses to these criticisms, indicating how the agency views its problem-oriented applied social research support mission in relation to those of other agencies. First, many of the studies are "crosscutting," that is, they are supported by an objective, nonbiased agency and their substance crosses the jurisdictions of several other agencies. Second, many of the service delivery systems have never been evaluated comparatively to determine the similarities and differences between service delivery problems in a variety of areas.[151] The Foundation has also stated that other agencies frequently urge it to fund research to avoid bias which might result from an agency's funding policy research directly related to its mission. For instance, with respect to possible overlap between NSF and the Department of Agriculture in conducting a technology assessment of integrated hog farming, the Foundation noted in part:

> This was carried out at the request of the Department of Agriculture. They could do it, but there has been a clear trend and attitude on the parts of the various mission agencies that they prefer, where the sciences foundation can pull together the expertise and carry out these assessments, that they so do it. Then you have an agency supporting the work that has no bias as to what the outcome would be.[152]

Another reason for the Foundation's initial support of certain research is that other agencies which might be interested in the research closely follow its course and pick it up when it reaches a stage ripe for development or application. For example:

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[146] Department of Housing and Urban Development, Space, Science, Veterans and Certain Other Independent Agencies Appropriations for Fiscal Year 1975. Senate Hearings, op. cit., p. 860.

[147] Department of Housing and Urban Development, Space Science, Veterans and Certain tions for 1976. House Hearings, op. cit., pp. 614–615.

[148] Department of Housing and Urban Development, space, science, veterans and certain Other Independent Agencies Appropriations for Fiscal Year 1975. Senate Hearings, op. cit., pp. 884–885.

[149] Department of Housing and Urban Development, and Certain Independent Agencies Appropriations, Fiscal Year 1976, Senate Hearings, op. cit., pp. 55–56.

[150] Ibid., p. 56.

[151] Statement of Dr. Alfred J. Eggers, Assistant Director for Research Applications, NSF. Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies Appropriations for Fiscal Year 1975. Senate Hearings, op. cit., p. 859.

[152] Ibid.

> [With respect to policy evaluation studies] LEAA, HUD, HEW, in every one of these areas, is part of the evaluation and monitoring team on all of these projects. In other words, we do not just have categorical coordination of programs. We have their people as part of the oversight teams that monitor these projects. Whenever the work comes to a point that the HUD's or LEAA's or the HEW's decided they want to move forward on a much larger scale because the promised payoff is great, then we transfer to them as in the case of the telecommunications applications to health care to be delivered to HEW.[153]

2. Irrelevance of Some Projects in Relation to "National Needs" and Problems in the Generalizability of Findings.—Other congressional criticisms of the Foundation's priorities for RANN applied social re-tional needs" (in relation to RANN's legislative mandate), and whether the findings of particular studies can be generalized, for instance, from one city to another.[154]

RANN officials report that they have made attempts to evaluate the generalizability of the findings of one study to another and that other political jurisdictions have found seemingly one-shot studies useful to them. For instance, in reacting to Senator Proxmire's criticisms about the utility of a study of cable TV franchising, NSF reported:

> Senator PROXMIRE. Cable TV, which you mentioned. There you have research on problems of reassessment for franchise decisionmaking, $267,500, 11 months. My staff talked to Dr. Straub of the University of Wisconsin in Madison about this project. To say the least, he had mixed reactions to the usefulness of this study.
>
> You cited that as an example of how effective RANN studies can be. Dr. Straub was chairman of the committee studying the franchising problem. He served on the Governors task force on cable TV. He is somewhat of an expert in the field. Dr. Straub said that the study was a very narrow approach to the complex field. It was of limited usefulness to any large city. He questioned the qualifications of the principal investigator of the study, Mr. Bear of the Rand Corp. He is a physicist and has been doing studies in economics. He does not demean Mr. Bear. He did say Rand has a continuing tendency to neglect industry's views on matters.
>
> In summary, he says that this particular study had very little application at all to this very large-scale problem. Even in a medium-sized city like Milwaukee it was of very little use. The mayor's office did not give the study a ringing endorsement, either.
>
> This report gives me very serious doubts about NSF judgment determining the use benefit in the grants in RANN.
>
> Do you have specific users in mind when you approve a grant, or do you approve a grant with only potential users in mind?
>
> Also why didn't FCC fund this project on the cable TV industry?
>
> Dr. EGGERS. FCC does not fund large projects of this type. They usually call on us to carry out assessments of this type. I am not familiar with the particular situation you refer to in Wisconsin. But we have carried out a survey that we would be pleased to provide for the record of mayors and councils throughout the United States. Some 40 percent, as I indicated earlier, had indicated that they found the results of the study useful to them in their decisionmaking.
>
> Senator PROXMIRE. Usually people would be happy to have money spent, as long as they do not have to spend it out of their budget. Somebody else can come along and do anything. They will indicate it is all right.
>
> You say 40 percent found it useful?

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[153] Statement of Dr. Alfred J. Eggers, Assistant Director for Research Applications, NSF. Department of Housing and Urban Development-Independent Agencies Appropriations for 1976. House Hearings, op. cit., p. 615.

[154] Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies Appropriations for Fiscal Year 1975. Senate Hearings, op. cit., p. 857.

Dr. **Eggers**. Forty percent.

Senator **Proxmire**. Here is an example of two cities, Madison and Milwaukee, that did not find it of any value.[155]

G. PROCEDURES USED BY RANN TO DETERMINE PRIORITIES

In hearings in 1975 before the House Committee on Science and Technology, RANN officials explained in considerable detail the sequence of steps involved in determining RANN's priorities. RANN uses a 5-year strategic planning process. Staff of the Research Applications Directorate continuously assess national research priorities and advise the separate RANN divisions about areas warranting problem-oriented research attention. According to a paper prepared by NSF, "The divisions then prepare strategic issue papers, which include problems to be solved, questions to be addressed, the research and evaluation strategy to be followed, and the utilization strategy. Objectives and activities are projected for a 5-year period, with maximum detail devoted to the first and second years."[156]

This process also involves evaluation of the incremental impact of research using a series of screening criteria.[157] In responding to questions posed by the House Committee on Science and Technology in 1975, RANN officials noted the importance given in this process to soliciting the views of potential users, scientists and the general public:

> RANN strategic planning involves meetings with representatives of Federal mission agencies, OMB, congressional staff, representatives of State and local officials, citizen public interest groups and social scientists. The purpose of these meetings is to identify important social problem areas where basic and applied social research is needed.[158]

The strategic planning process "also involves formal interaction with other Federal agencies through an Interagency Committee that functions at the level of Assistant Secretary for R. & D. and through technical panels for each major operating unit."[159]

H. INADEQUACIES IN RANN PROCEDURES TO DETERMINE PRIORITIES, AS IDENTIFIED BY THE GENERAL ACCOUNTING OFFICE

In its recent report on management of the RANN program, the General Accounting Office assessed RANN's planning process in greater detail, noting in particular that the Directorate does not seem to give enough attention to user needs and to coordination with other Federal agencies in determining priorities for support. GAO's assessment of the planning process is summarized next.

1. The Use of Advisory Groups in Formulating RANN's Initial Priorities.—Before the RANN program was initiated formally and during its first few years of operation, the Foundation solicted advice from the National Academy of Engineering's Committee on Public Engineering Policy (COPEP) about RANN research priorities. During the spring of 1969 the Foundation asked COPEP for suggested priorities for the RANN programs. COPEP subsequently prepared two reports, "Priorities in Applied Research: An Initial Appraisal," and "Federal Support of Applied Research." Subsequently, COPEP reviewed national problem-oriented research priorities in relation to RANN's program, at RANN's request. Its third report, "Priorities for Research Applicable to National Needs," was published in 1973.

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[155] Ibid., pp. 877–878.

[156] Appendix I. Research Applications. Planning, Funding, and Evaluation Process: Policy Research and Applied Social Research. In 1976 National Science Foundation Authorization, Hearing, op. cit., p. 286.

[157] Hearings, Ibid., p. 280.

[158] Research Applications. Planning. Fundings, and Evaluation Process: Policy Research and Applied Social Research. In 1976 National Science Foundation Authorization, Hearings, op. cit., p. 286.

[159] Hearings, ibid., p. 280.

According to the General Accounting Office the COPEP studies "have provided major input into developing RANN research priorities" and programs.[160] GAO reported, for instance, that the Academy's second study, "Priorities for Research Applicable to National Needs" contained 31 recommendations for research grouped under six problem areas, and that the third report assigned priority rank to the 31 previous recommendations. The problem areas and priority ranks were:

> Community development and human resources; environmental quality; conservation of energy, materials, and land; industrial and production processes; hazards and disasters; and exploratory development and technological opportunities. The 1973 report then ranked the 31 recommendations into three categories: those programs considered to be of highest priority, those programs of next highest priority, and those programs which the committee did not assign a priority due to lack of time or information. Recommendations were not ranked within each priority category.[161]

For additional information, see table 31.

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[160] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 6.

[161] Ibid., p. 10.

TABLE 31.—RECOMMENDED RESEARCH AREAS FOR FISCAL YEAR 1974 RANN PROGRAM[1]

	Priority categories		
Problem areas	A—Highest priority	B—Next highest priority	No priority assigned
Community development and human resources.	Improving local service delivery systems.	Social and organizational indicators; evaluation methodology of social programs and services; community growth, trends, and forces; regulatory implications and technological innovations for urban growth and population distribution; analysis and implications of changes in the socioeconomic sector.	Communications and transportation.
Environmental quality		Environmental effects of energy production; assessment of environmental research efforts; institutional arrangements and implementation processes related to environmental policy; research on the biological and physical environment.	Agriculture and lightly managed ecosystems; research on the social and economic environment; decision-relevant research on environmental systems.
Conservation of energy, materials and land.	Conservation and management of materials and land; energy consumption and conservation; institutional and regulatory systems as they affect energy.		

TABLE 31.—RECOMMENDED RESEARCH AREAS FOR FISCAL YEAR 1974 RANN PROGRAM [1]—Continued

Problem areas	Priority categories		No priority assigned
	A—Highest priority	B—Next highest priority	
New production process	Industrial processes and manufacturing.		Energy provision; enzyme technology; excavation and tunneling.
Hazards and disasters	Optimizing the Nation's adjustment to natural hazards.	Management of hazards caused by surface waters; fire research and a national fire-modeling facility; earthquake research program; weather hazard modification.	Experimental short-range weather warning service.
Exploratory development and technological opportunities.	Technological opportunities; exploratory research and assessment of the future.		National system of electronic storage and retrieval of the printed work; product safety, marketability, risk-benefit analysis.

[1] Opportunities for Improved Management of the Research Applied to National Needs Program, op. cit., p. 11.

GAO also pointed out that an NSF memorandum of March 1973 ". . . from RANN's program manager responsible for the committee's study noted that a high correlation existed between the report's recommendations and RANN's anticipated program plans for the fiscal years 1974 and 1975," [162] and that its own assessment of the origin of RANN's general priorities reflected a similar pattern.[163]

2. The current absence of coordination with interagency groups, other outside advisers, and users in determining priorities for projects within general support areas.—GAO also evaluated the origin of specific projects funded by RANN within each of the priority areas identified in the NAE study. This assessment indicated that RANN managers do not seem to draw effectively upon the advice and resources of other agencies or upon the coordinating committees established for this purpose. For instance, GAO reported:

> As of April 1, 1974, approximately one-third of the research programs in RANN originated within another Foundation directorate. Studies by the Committee on Public Engineering Policy have influenced RANN in developing its criteria for selection of new program areas and techniques for program management. Development of new programs resulted primarily from a combination of the committee's general recommendations, the interest and experience of RANN staff, and the subjects of unsolicited proposals received by RANN from researchers. The Interagency Coordinating Committee appears to have a limited impact on program development.[164]

In greater detail, GAO said that in order to coordinate its work with other agencies, the Foundation established a RANN Interagency Coordinating Committee composed of agency representatives whose responsibilities fall within the scope of RANN. The committee was under the auspices of the Federal Council for Science and Technology, and was chaired by the President's Science Adviser, also Director of the Office of Science and Technology (OST). When the OST was abolished, the committee was transferred to the NSF which reconstituted the committee with the foundation's Assistant Director for Research Applications as its chairman. According to the General Accounting Office, agencies represented on the committee, as of July 1974, included:

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[162] Ibid., p. 10.
[163] Idem.
[164] Ibid., p. 5.

> The Departments of Agriculture, the Interior, Transportation, Commerce, Labor, Justice, Treasury, State, Defense, Housing and Urban Development, and Health, Education and Welfare; the Environmental Protection Agency; NASA; the Atomic Energy Commission; the Council on Environmental Quality; the Office of Telecommunications Policy; the Federal Energy Administration; OMB and the Foundation.[168]

Separate panels of the RANN Interagency Coordinating Committee consisting of representatives from agencies whose work overlapped that of the RANN programs, were formed for each of the subject areas covered by RANN. A panel was constituted, for instance, for Social Systems and Human Resources section. (See table 32.) However, according to the GAO, this panel seems to have played a very insignificant role in helping coordinate RANN's applied social research:

TABLE 32.—*FCST Committee on RANN Coordination: Social Systems and Human Resources Panel*[1]

Dr. Harvey Averch, Chairman

Mr. Calvin Banks, Chief, Community Planning Assistance Division, Department of Transportation, Washington D.C. 20590, 426–0163, Room 9400.

Alternate:

Mr. Lawson McKenzie, Research Analyst, OS, Department of Transportation, Washington, D.C. 20590, 426–0190, Room 10422.

Mr. Peter S. Barth, Director, Office of Research, Department of Labor, Washington, D.C. 20210, IDS 110–5418, Room 5214.

Dr. Allan Carlin, Director, Implementation Research Division, Environmental Protection Agency, Washington, D.C. 20460, 755–0650, Room 3206B.

Mr. Lynn M. Daft, Assistant Deputy Administrator for Economic Research, Department of Agriculture, Washington, D.C. 20250, 44[illegible]–8[illegible]24, Room 446.

Mr. Calvin L. Beale, Leader of Population Study Group, Department of Agriculture, Washington, D.C. 20250, 447–8717, Room 496.

Lt. Col. Henry Taylor, Military Asst. for Human Resources, Office of the Secretary of Defense, ODDR&E (E&LS), Washington, D.C. 20301, OX 5–9777, Room 30129.

Dr. Frederick Heinselman, NILECJ/LEAA, Department of Justice, Washington, D.C. 20530, 382–6226, Room 510.

Ms. Karen Joerg, Research Assistant, LEAA, Department of Justice, Washington, D.C. 20530, 382–4683, Room 318.

Mr. Roger A. Prior, Acting Director, Office of Economic Research, Department of Commerce, Washington, D.C. 20230, 967–3241, Room 6018.

Dr. George Suzuki, Deputy Chief, Technical Analysis Division, NBS, Department of Commerce, Washington, D.C. 20234, 921–3563, Room A161, Bldg. 225.

Mr. Wyndham Clarke, Director, Division of Community Planning, Development and Conservation, Office of Policy Development & Research, Department of HUD, Washington, D.C. 20410, 755–7390, Room 4266.

Mr. Walton Francis, Office of the Assistant Secretary for Planning and Evaluation, Department of HEW, 330 Independence Avenue, SW., Washington, D.C. 20201, 963–7203, Room 4426, North Building.

[1] Department of Housing and Urban Development Space Science, Veterans, and Certain Other Independent Agencies Appropriations for Fiscal Year 1975. Senate hearings, op. cit., p. 883.

As of March 1974 the panel corresponding to RANN's Social Systems and Human Resources Division had met twice in 1971 and once each in 1972 and 1973 to discuss program plans for the coming fiscal year as well as general questions of coordination between agencies. The March membership included representatives from the Departments of Agriculture; Transportation; Commerce; Labor; Justice; Housing and Urban Development; and Health, Education and Welfare, and the Environmental Protection Agency.[166]

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[168] Ibid., p. 16.

GAO's December 1975 review of the RANN program also evaluated the use of advisory groups in determining priorities. Generally it found that NSF makes far less use of these groups than it says. For example, the RANN Advisory Committee, formed in October 1970, played an important role in assisting the Foundation develop original priorities for support:

> During its two meetings in 1971 the Advisory Committee was briefed on RANN's fiscal years 1972 and 1973 program plans. The committee reported to RANN in December 1971 and the National Science Board the following April that it unanimously believed that RANN should be encouraged to move in the general direction pursued to date.[167]

However, according to GAO, the Foundation had not implemented some of the Advisory Committee's recommendations for improved management which included soliciting advice from outside the Federal Government:

> [The committee] stated that there was a serious risk of RANN becoming so diffused in the number of problems considered that it would fall short of achieving significant results in any one program area. The Advisory Committee also recommended that RANN give more attention to soliciting judgments from scientists outside the Federal government. It is believed that an appraisal of program definition and priorities by outside groups was highly desirable, especially in social systems research.[168]

Furthermore, GAO noted that the committee did not meet during the period June 1972 to the beginning of 1975.[169]

GAO was informed by NSF that RANN program managers coordinate their work with other interagency committees established to coordinate the support and use of federally sponsored research:

> According to Foundation memorandums dated May 31, 1974, and August 13, 1974, Research Applications Directorate staff also participated on approximately 27 groups sponsored by other Federal agencies and 6 groups sponsored by the Foundation's Federal Council for Science and Technology relating to RANN-sponsored research. In addition, an April 16, 1975 memorandum by the deputy assistant director for science and technology listed about 20 additional interagency coordinating groups and task forces of which RANN program managers were members.[170]

However, only two of the committees mentioned in the April 16, 1975 memorandum relate to social sciences. They are: the interagency discussion group on disaster mitigation and the quality of working life group.[171] Only one of the interagency committees of the Federal Council for Science and Technology, in existence as of December 31, 1974, related to social sciences, and only tangentially. This was the Ad Hoc Committee on Domestic Technology Transfer.[172] No information seems to be readily available about the 27 other committees mentioned by GAO.

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[166] Ibid., p. 17.

[167] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 14.

[168] Ibid., pp. 14–15.

[169] Ibid., p. 15.

[170] Ibid., p. 17.

[171] Memo on interagency coordinating groups and task forces from NSF to GAO, April 16, 1975.

[172] Federal Council for Science and Technology. Report on the Federal R. & D. Program, Fiscal Year 1976. Washington, U.S. Government Printing Office, 1975, pp. 161–164.

It should also be pointed out that, unlike the Division of Social Sciences, RANN has not established advisory panels for the separate discipline areas supported in the RANN program, an omission which may prevent RANN staff from obtaining the best possible advice about trends in research and capable researchers.

I. THE PREDOMINANT ROLE OF PROGRAM MANAGERS AND OTHER NSF STAFF IN DETERMINING PROJECT SUPPORT PRIORITIES

GAO's assessment of the origin of specific RANN research support projects indicated that most of the projects funded by the Divisions of Social Systems and Human Resources and Exploratory Research and Problem Assessment (which funded most applied social research), originated from within the Foundation, not from consultation with other agency officials. (See table 33.)

TABLE 33.—SOURCE OF RANN FISCAL YEAR 1974 PROGRAMS, ACTIVE ON APRIL 1, 1974, SOCIAL SCIENCE-RELATED PROGRAMS [1]

	Transferred within the Foundation from Office of Interdisciplinary Research	Other directorates	Committee on Public Engineering Policy	Joint Foundation-NASA solar energy study	The Nation's energy future	Federal Council for Science and Technology	Other interactions with Federal agencies	Unsolicited proposals	RANN staff's interest or past experience
Social systems and human resources:									
Municipal systems and services:									
Urban systems technology	X								
Telecommunications			X				X	X	X
Natural disaster and human behavior								X	X
Government structure			X				X	X	
Transportation							X	X	
Evaluation of mathematical model						X	X		
Research assessment in municipal systems			X			X			
Human resources and services:									
Law, science and technology	X								
Revenue sharing								X	X
Research assessment in human resources									X
Exploratory research and problem assessment:									
Consumer research								X	X
Minority group problems	X								
Alternative futures									X
New problems and projects	X								
Technology assessment									
Total	4	0	3	0	0	2	4	6	6

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[1] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 19.

Specifically of 26 social research related actions whose origin could be identified clearly, only 6 originated from consultations with other agencies; 3 originated in priorities reports prepared for NSF; the rest originated from unsolicited proposals or suggestions from RANN program managers or other NSF officials.

1. An example of inadequacies in research design resulting from lack of consultation with outside advisors and users: Research on general revenue sharing.—In addition to obtaining the above aggregated data, GAO prepared detailed reviews of the roles of other agencies, interagency coordinating committees, and users in formulating priorities for research dealing with the revenue-sharing program administered by the Division of Social Systems and Human Resources. GAO's critique of the origins of the program is excerpted below:

REVENUE-SHARING PROGRAM

On October 20, 1972, the State and Local Fiscal Assistance Act, better known as the Revenue Sharing Act, was signed into law. The act provided for allocating $30.2 billion to State and local governments over 5 years, beginning January 1, 1972. Congressional debates on renewal of the general revenue sharing program, set to expire December 1976, are expected during 1975.

A National Planning Association official estimated that as of December 1973 about $4 million had been invested in general revenue sharing research. RANN's research program in general revenue sharing, estimated at $2.7 million, represents a major effort to provide information for the 1975 congressional debates. The cognizant RANN program manager advised us that RANN supports this effort primarily because other Federal agencies, such as the Office of Revenue Sharing, Department of the Treasury, and the Advisory Commission on Intergovernmental Relations, although having an interest in the area, do not have the necessary research budget.

The Office of Revenue Sharing is responsible for distribution of funds, establishment of overall regulations, provision of the accounting and auditing procedures, evaluations, and reviews necessary to insure full compliance with the act. The Advisory Commission on Intergovernmental Relations, a permanent bipartisan organization of 26 individuals from the executive and legislative branches of Federal, State, and local governments, was requested by former President Nixon to monitor the program's impact on the various levels of government.

RANN's program manager in charge of revenue sharing said new research programs must (1) meet existing research needs, (2) not duplicate the work or fall within the mission responsibility of other Federal agencies, and (3) have been discussed with experts in the area. These decision rules are roughly comparable to certain elements of the RANN criteria. However, the program manager indicated that there were no formal written procedures governing development of new research programs. Programs often develop in an almost ad hoc manner within these general decision rules.

The program in revenue sharing began to develop between approximately September 1972 and February 1973 as the Social Systems and Human Resources Division received various unsolicited proposals for research in this area. Informal discussion within the division concerning these proposals led to a May 1973 grant for a revenue sharing planning conference.

PLANNING CONFERENCE

The conference, held for 3 days in December 1973 and attended by 129 individuals, was conducted by the National Planning Association to assess the status of revenue sharing research and to develop an agenda of research topics which RANN might begin to support.

Conference participants, selected primarily by the grantee subject to RANN's general review, included researchers currently involved in revenue sharing, Federal agencies responsible for revenue sharing, and interested community groups identified by the private Center for National Policy Review. Approximately 45 percent of the participants were from the academic community, 25 percent from private research organizations, 20 percent from Federal agencies, and 10 percent from State and local governments.

They discussed such topics as the allocation formula and restrictions on the use of funds, revenue sharing's impact on government structure and organization and the public sector, and data and research methodologies necessary to test these topics. The conference resulted in a compendium of research in progress, reports of its proceedings, and a list of approximately 500 researchers involved in the area.

PROGRAM PLAN

RANN's program manager said a draft program plan for funding future research projects was prepared based on RANN's assessment of revenue sharing research already in progress, topics recommended by the conference, and the availability of data. The plan called for the creation and analysis of revenue sharing data files, a national survey of State and local officials, an analysis of alternative allocation formulas, and small projects which fill the gap in ongoing research efforts.

A final program plan has not been developed. The plan's latter two objectives, however, were further refined through a program solicitation and announcement.

PROGRAM SOLICITATION AND ANNOUNCEMENT

RANN's program solicitation asked for research proposals on the feasibility of using alternative allocation formulas for achieving certain identified goals. The goals included splitting funds between State and local governments to reflect variations in States responsibility for service delivery, providing more assistance to cities and counties with the greatest needs, and designing a formula which makes allocations less susceptible to fluctuations.

The program announcement identified 13 high priority topics on such general policy questions as the impact of general revenue sharing on local intergovernments, the costs and consequences of restrictions on local governments' use of funds, and citizens involvement in deciding the use of general revenue sharing funds.

In June 1974 drafts of the solicitation and announcement were reviewed by Foundation officials and 50 reviewers from other Washington, D.C., based organizations. About two-thirds of the non-Foundation reviewers were congressional staff members or representatives of Federal agencies involved with revenue sharing. Twenty-two percent represented such public interest groups as the National Governors Conference, and 12 percent represented such groups as the National Association of Social Workers and the League of Women Voters. Slightly less than half these 50 reviewers had attended the December 1973 planning conference.

The reviewers were allowed 10 calendar days to respond. RANN's program manager advised us that approximately 20 of the 50 non-Foundation reviewers responded within this time frame. Eighty percent of the respondents were from Federal agencies or congressional staffs.

The former director of the Social Systems and Human Resources Division stated the short time allowed for reviewer comments resulted from the difficulties RANN experienced in resolving potential conflict-of-interest problems and RANN's desire to provide timely information for congressional hearings which were then expected to be held in the spring of 1975. He said although all interested parties should assist in identifying broad research areas, those expected to submit competing proposals in response to a solicitation cannot participate in planning the solicitation since their involvement would create a conflict of interest. Since RANN identified the academic community, representatives of State and local governments, and public interest groups as potential proposers under the solicitation, these groups were not initially asked to help draft the solicitation. In late May 1974, however, RANN decided to exclude State and local governments and public interest groups from the competition since the objectivity of their research reports might be questioned.

VIEWS ON REVENUE SHARING'S DEVELOPMENT

Minutes of meetings held by the Interagency Coordinating Committee and its Social Systems and Human Resources panel do not mention developing a revenue sharing program. RANN, however, has actively encouraged participation of Federal agencies and congressional committees intricately involved in formulating and administering general revenue sharing. RANN has also involved many researchers representing major organizations, such as the Brookings Institution and the University of California, at its planning conference to minimize potential duplication of research.

It appears that the way RANN's revenue sharing program developed did not provide for full involvement of groups representing State governments and the interests of poor and minority citizens. Representatives of these groups, who had attended RANN's revenue sharing conference, advised us that they had not been involved in the program's development since the conference, were not aware of the program's plans, and generally believed they should have been involved before program plans were finalized. In addition, the director, National Revenue Sharing Project, Center for National Policy Review, said from his vantage point RANN's development of new programs was essentially a closed process.

RANN did request major State and local groups, such as the National Governors Conference, National League of Cities, the Municipal Finance Officers Association, and the International City Management Association, to review drafts of its revenue sharing program announcement and solicitation. However, the 10-day limitations on reviews presented problems in obtaining comments. For example, the deputy director of the National Governors Conference said the time limitation prevented him from soliciting the opinions of individual State budget directors, and because he served as a liaison between Federal agencies and State officials rather than an expert on State views, his own cursory review of RANN's program plan was not an effective involvement of State governments. An associate director for State Services, Council of State Governments, also emphasized the importance of involving regional and State groups in program development. The associate director also believes that RANN should involve these State groups before, rather than after, the decision is made to develop a new research program.[173]

2. GAO's recommendations to improve the interface with users and advisers in determining priorities.—The above example indicated that RANN does not seem to have formal procedures to identify specific priorites for research project support and that users and interagency committees are not used as effectively as possible in determining priorities. As a result of this review and those of several other programs, GAO concluded:

> If RANN is to support research which is most responsive to national needs, it must provide the opportunity for those with a wide variety of interests to participate in developing new programs. Formal systematic procedures for developing research programs would aid RANN in insuring that interested organizations have opportunities to participate in developing new programs.[174]

The agency recommended that NSF adopt formal procedures to communicate with other agencies and users in developing priorities. Specifically:

> That the Foundation's Director require that formal procedures be established for developing RANN's research programs which would widely publicize its interest in developing a program area. The procedures should also provide communication mechanisms with interested persons, organizations, and Federal agencies having related programs to obtain their views during initial program development stages and in finalizing program objectives and plans.[175]

NSF apparently has taken steps to rectify some of these problems, but GAO reported that NSF is concerned that wider communication with the public and other agencies might not be as cost-effective as expected:

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[173] Ibid., pp. 25–29.
[174] Ibid., p. 30.
[175] Ibid., p. 30.

AGENCY COMMENTS

> By letter dated July 17, 1975, the Foundation agreed with our recommendation and stated that RANN will experiment with new ways of obtaining user and public input. . . . In this respect, regional seminars were taking place to acquaint a broad spectrum of users, scientists, and the public with RANN programs and plans and to obtain their feedback. RANN also planned further experiments, as part of a strategic planning and evaluation process, with the objective of developing prototype systems to better obtain input from scientists, users, and the public. RANN plans to select the most cost-effective prototype systems as part of its strategic planning process.
>
> The Foundation commented that the cost effectiveness of alternative procedures for obtaining input from scientists, users, and the public must be considered because obtaining such data is costly and time consuming, but agreed that such data is necessary.[176]

J. PROPOSAL REVIEW PROCESSES

Although RANN solicits proposals for some research programs, most RANN awards are for unsolicited proposals. GAO noted that "Of the 829 RANN awards made during fiscal year 1971–74, about 93 percent of 1,710 awards resulted from unsolicited proposals." [177] In its recent review of the RANN program, the GAO described the proposal review process for both types of proposals and identified several inadequacies in proposal review. These topics will be discussed in sequence next.

1. Procedures in proposal review.—According to the GAO, RANN proposal evaluation consists of the following major sequential processes:

> (1) Initial determination of a potential research project's scientific merit and applicability to RANN objectives through consideration of informal inquiries or preliminary proposals or through preliminary review of formal proposals;
>
> (2) Formal review by the program manager and others (usually peer reviewers);
>
> (3) Determination by the program manager to recommend award or declination;
>
> (4) Review of the evaluation and program manager's recommended action by the division or office director and Research Application Directorate's Grant Review Board; and
>
> (5) Final review and action at the Research Application Directorate and Foundation levels.[178]

Nine criteria form the basis of proposal evaluation. These are:

> (1) Applicability to RANN program needs and objectives, (2) scientific merit, (3) expected usefulness of the research results, (4) the plan for managing the research project, (5) plans for distributing and utilizing results, (6) qualifications of the research team, (7) relationship to other RANN projects within a given program area, (8) reasonableness of costs to benefits, and (9) funds available in the program area.[179]

A major evaluation tool is peer review. It is used by the program manager, to obtain the views of recognized experts in the various disciplines or interdisciplinary areas addressed by the proposal.[180]

Usually program managers use mail review for unsolicited proposals and panel review for solicited proposals, although large dollar unsolicited proposals may be subject to panel review. GAO noted that,

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[176] Ibid., pp. 30–31.
[177] Ibid., p. 45.
[178] Ibid., pp. 50–51.
[179] Ibid., p. 51.
[180] Ibid., pp. 127–131.

"The program manager uses his judgment in selecting reviewers."[181] Site visits to potential grantees are also used, if necessary. After receiving review comments, the program manager evaluates and summarizes them, and if necessary suggests changes to the researcher. The researcher may also be given an opportunity to withdraw a proposal if necessary. If an unsolicited proposal succeeds through these review steps, the program manager will submit a summary of each recommended proposal to all RANN divisions and office directors for comment. The Office of Intergovernmental Science and Research Utilization also is required to review the utilization plans of all unsolicited formal proposals requesting funding of at least $150,000. The recommended proposal and detailed information about it are then submitted to the RANN's Grant Review Board. The Board, as of early 1975, consisted of—

The deputy assistant director for science and technology, the chairman;

The deputy assistant director for analysis and planning, the vice-chairman;

The director, Office of Programs and Resources;

A program analyst, Office of Programs and Resources, and the executive secretary;

A representative of the Office of the General Counsel; and

A representative of the Office of Grants and Contracts.[182]

The review precedure continues as follows:

> Recommended actions which are approved by the Board are subject to additional Directorate level concurrence. The assistant director for Research Applications or his deputy sign all awards of $50,000 or greater, and the chairman of the Board's Executive Committee may sign all those under $50,000 and all declinations. All awards must also be approved by the Foundation's Director or his designee, the Grants and Contracts officer. Also, the Foundation's National Science Board must approve awards which involve expenditures of at least $500,000 in a single year or at least $2 million in total. When it is determined that a proposed award must eventually be approved by the National Science Board, the Research Applications Directorate prepares an information package which is similar to the Grant Review Board package and forwards it to the National Science Board through the Foundation's Director.[183]

2. Review of proposals submitted under program solicitations and requests for proposals.—Program solicitations and requests for proposals by the Research Applications Directorate are designed to generate the submission of proposals in clearly defined areas. They differ from unsolicited proposals in that the solicitation period is not open-ended; all proposals submitted under a solicitation compete with each other; and solicited proposal awards do not require the awardees to participate in cost-sharing unless so specifically stated.[184] As of October 14, 1974, RANN had issued 14 program solicitations.[185] Eight were in the social sciences area. See table 34.

Requests for proposals state specific objectives and work procedures. According to GAO, as of October 14, 1974, RANN had issued 15 requests for proposals.[186] Five were in the social sciences area. See table 35.

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[181] Ibid., p. 127.
[182] Ibid., p. 130.
[183] Ibid., p. 131.
[184] Ibid., p. 52.
[185] Idem.
[186] Ibid., p. 53.

Table 34.—*RANN's Requests for Proposals Used as of October 14, 1974*[1]

Fiscal year and title	*Purpose*
1972:	
Photothermal Energy Conversion for Central Power Station Generators.	Study four separate concepts of photothermal energy conversion, outline a research program for each concept, prepare a program plan leading to demonstration for each concept, conduct a cost benefit analysis of full-scale systems in terms of energy units delivered, and provide general guidance on costs and schedule for prototype solar powerplant.
1973:	
System of Identifying and Assembling List of Technology Assessments.	Establish a list of technologies, the impacts of which on society are proposed to be studied, and propose priorities from the candidates on this list.
Training Course in Program Management.	Develop and teach a course in program management to Foundation personnel.
Solar Energy Utilization for Heating and Cooling of Buildings.	Establish the theoretical feasibility of solar heating and cooling of buildings and provide the basis of planning for the later phases of solar energy applications.
Support of Committee on Forecasting Models, Federal Council on Science and Technology.	Design and conduct survey of nondefense Federal modeling activities.
Technology Assessment in Solar and Geothermal Energy.	Conduct technology assessment of the development of (1) U.S. geothermal resources and (2) technologies for terrestrial applications of solar energy.
1974:	
Provision of Working Paper in Solar Energy Applications.	Provide a series of evaluations and economic analyses which would indicate the potential market availability and potential market applications of each of RANN's six solar energy activities.
Systems Study of Geothermal Program.	Perform a systems analysis of the Foundation's Geothermal Energy Research Program; based on this analysis, develop a recommended 5-year preliminary program development plan emphasizing proof-of-concept experiments and the supporting advanced research required in the program.
Systems Study for Tunneling Plan	Perform a systems analysis of tunneling techniques for urban areas upon which research program plans leading to proof-of-concept experiments for improved tunneling techniques can be based.
RANN Symposium Support	Initiate a major Foundation program to disseminate the results of research in the RANN and Intergovernmental Science Programs.

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[1] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., pp. 140–143.

Table 34.—*RANN's Requests for Proposals Used as of October 14, 1974*[1]—Con.

Fiscal year and title	*Purpose*
1974:—Continued	
Management Information System Requirements Study.	Perform a supplementary study in the Research Applications Directorate to identify new management information requirements of the directorate's top management.
Experimental Annotated Bibliography of Policy Analysis on Social Programs.	Develop an experimental policy analysis source book to be used by program analysts and evaluators concerned with social programs and policies within Federal domestic agencies and at State and local levels.
1975:	
Prototype Research Review	Provide a prototype research review and compilation of results from awards made by RANN's Division of Social Systems and Human Resources from July 1, 1970, through June 30, 1973. The research review will examine the products from the awards, relate them, and prepare nontechnical reports of results for use by decisionmakers and the public.
Development and Experimental Application of a Research Planning Protocol.	Develop and experimentally apply a research program planning protocol.
Development of Project Development Plans in the Area of Energy Resources Technology.	Help prepare project development plans and other documentation necessary to facilitate the transfer of portions of the RANN energy program to other Government agencies.

Table 35.—*RANN's Solicitations Used as of October 14, 1974*[1]

Fiscal year and title	*Purpose*
1973:	
Evaluation of Policy-Related Research in the Field of Municipal Systems, Operations, and Services.	Make a significant body of policy-related research on municipal systems more accessible and usable by policymakers and provide a more rigorous basis for future research projects dealing with policy-related research on municipal systems.
Evaluation of Policy-Related Research in the Field of Human Resources.	Make a significant body of policy-related research on human resources more accessible and usable by policymakers, indicate those areas lacking in significant policy-related research, and provide a more rigorous basis for future research projects dealing with policy-related research on human resources.
Exploratory Technology Assessments in Selected Areas.	Provide a substantive, comprehensive, useful input into public policy formulation and decisionmaking with regard to the application of particular technologies; explore and encourage technology assessment and the application of systematic methods, techniques, protocols, and approaches to complex, policy-related problems; and encourage the growth

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[1] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., pp. 133–136.

TABLE 35.—*RANN's Solicitations Used as of October 14, 1974*[1]—Continued

Fiscal year and title	*Purpose*
1973:—Continued	of organizational capability to conduct impartial, comprehensive technology assessments.
Telecommunications	Develop the collective capability outside the Government for conducting research on long-range telecommunications policy.
1974:	
Research on Subsystems and Systems for the Application of Solar Energy to the Heating and Cooling of Buildings.	Stimulate innovative research on the technologies that may be required for widespread application of solar energy to heat and cool buildings.
Decision-Related Research in the Field of Local Government Management.	Provide the knowledge needed to improve the delivery of local government services by evaluating or analyzing alternative policies and practices relating to the measurement, pricing, and planning of services and foster extensive use of validated alternatives among local governments.
Decision-Related Research on the Organization of Service Delivery in Metropolitan Areas.	Provide the knowledge for improving delivery of selected municipal services by describing, analyzing, and evaluating alternative organizational arrangements for service delivery in U.S. metropolitan areas and extensively disseminate the results to local governments, relevant Federal agencies, and concerned professional and public interest groups.
Decision-Related Research on Technology Utilized by Local Government.	Improve the information available to local government officials for use in specifying and selecting equipment technologies.
Design Studies for Experimental Application of Two-Way Cable Communications to Urban Social Service Delivery and Administration.	Design social experiments to test the costs and benefits of applying two-way cable communications to the delivery of social services in urban settings and improve urban administration.
Ocean Thermal Energy Conversion:	
Part A—Research on an Engineering Evaluation and a Test Program.	Establish guidelines for systems optimized from both a technical and economic standpoint by analyzing design concepts for large floating ocean thermal powerplants.
Part B—Advanced Research and Technology on Key Program Elements.	To establish system viability of large-scale floating powerplants for converting substantial amounts of ocean thermal energy into more usable forms.
Research on Wind Energy Conversion Systems.	Advance the scientific and technological bases necessary for developing reliable, practical, and cost competitive wind energy conversion systems as an alternative source of significant quantities of energy and determine requirements, assess applications, and stimulate innovative research on the problem and technologies of wind systems to support achieving the overall program objective.

TABLE 35.—*RANN's Solicitations Used as of October 14, 1974*[1]—Continued

Fiscal year and title	*Purpose*
1975:	
Research on General Revenue Sharing.	Obtain applied research findings on selected topics related to the impact of the State and Local Fiscal Assistance Act of 1972 (Public Law 92–512).
Alternate Formulae for General Revenue Sharing.	Provide a comprehensive review of formula possibilities likely to receive serious consideration during debates over renewal of the State and Local Fiscal Assistance Act of 1972 (Public Law 92–512).
Technology Assessment in Selected Areas.	Provide a substantive, comprehensive, useful input into public policy formulation and decisionmaking with regard to the application of particular technologies; explore and develop techniques of technology assessment and supply systematic methods, techniques, protocols, and approaches to complex, policy-related problems; and encourage the growth of organizational capability to conduct impartial, comprehensive technology assessments.

Review of proposals submitted under program solicitations differs from review of unsolicited proposals. First, the program solicitation itself must be approved by the Grant Review Board, and by the National Science Board if "any award under the solicitation is anticipated to be $500,000 or greater in a single year or $2 million or greater for the total research project."[187]

A two-step process similar to bid/evaluation procedures typically used in Federal research procurement practices is used to evaluate proposals received by the closing date of the program solicitation. A preliminary ranking of competitive proposals is obtained. Competitive proposals may be revised by researchers as requested by the Foundation or be retained as is. The members of the panel which performs these steps are "technical members of the Foundation, peer reviewers, or others chosen by the program manager, with administrative members selected from within the Foundation, usually the Grants and Contracts Office."[188]

After Division directors give their concurrence, the competitive proposals or recommended proposals are submitted to a RANN Source Selection Board for review and approval.[189] During GAO's review of RANN, the RANN Source Selection Board consisted of:

The Assistant Director for Research Applications, the Chairman;

The Deputy Assistant Director for Science and Technology, the Vice Chairman;

The Deputy Assistant Director for Analysis and Planning;

The Director, Office of Programs and Resources; and

A program analyst from the Office of Programs and Resources, who also serves as the executive secretary.[190]

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[187] Ibid., p. 137.
[188] Ibid., p. 138.
[189] Idem.
[190] Ibid., p. 139.

Recommended declinations are reviewed again by the executive committee of the Grant Review Board.

Proposals submitted under requests for proposals are reviewed differently. The GAO explained this procedure as follows:

> The program manager and the Grants and Contracts Office assemble the panel to evaluate the proposals. The program manager selects the technical members to rank the proposals based on scientific merit, and the Grants and Contracts Office selects members of its staff to rank the proposals on cost. After rankings, the total panel, which is chaired by a Research Applications or RANN division official, is convened to determine the competitive range of the proposals. Competitive proposals are those from responsible bidders which are responsive to the specifications in the solicitation and are within an allowable cost range. Proposers not within the competitive range are notified of their elimination.
>
> For those proposals within the competitive range, the Grants and Contracts Office, assisted by the program manager, negotiates where possible and obtains best and final offers. The panel then reconvenes and reranks the proposals, if necessary, and determines the proposed awardees. The selection of successful bidders requires concurrence by the responsible RANN division or office director and eventually must be approved by the Foundation's contracting officer.
>
> The program manager prepares a memorandum explaining the request for proposal development, evaluation of proposals, and the selection of awardees.[191]

K. RECOMMENDATION TO IMPROVE PROPOSAL REVIEW PROCESSES

As part of its review of the RANN program, the General Accounting Office also surveyed researchers who had submitted proposals to RANN to obtain their views on the propriety and effectiveness of these evaluation procedures.[192] A summary of the major GAO findings on these issues follows.

Generally the "researchers' responses . . . indicate they would prefer major changes in RANN's policies, procedures, or practices for evaluating research proposals." [193] Among the changes suggested were the following: the need for "more controls for objectivity in selecting peer reviewers," [194] since reviewers are now selected exclusively by program managers, who often excluded potential user groups; [195] development of more "systematic methods for evaluating quality of reviews;" [196] "receipt of specific comments on . . . proposals with many researchers asking for verbatim text of reviewers' comments, more explicit reasons for their proposals not being funded; and some improvement in the processing time for their proposals." [197]

The GAO stated the Foundation should consider these changes since "the success of the program depends partially on its rapport with the research community, which influences its ability to attract the best researchers." [198] RANN reported to the GAO that it would consider making some of these changes.

In addition, on June 30, 1975, the National Science Board adopted a resolution to provide more public information about and participation in proposal reviews. The resolution indicated that:

> The Foundation would publish annually a list of all reviewers used by each division.

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[191] Ibid., pp. 144–145.
[192] Ibid., pp. 54–69.
[193] Ibid., p. 67.
[194] Idem.
[195] Ibid., p. 59.
[196] Ibid., p. 67.
[197] Ibid., p. 67.
[198] Ibid., p. 68.

Program officers should seek broadly representative participation of qualified individuals as reviewers.

Verbatim copies of peer reviews requested by the Foundation after January 1, 1976, not including the identity of the reviewer, would be made available to the principal investigator/project director upon request; and the question of including the identity of the peer reviewer would be considered further by the Board.

The Foundation, upon request, would inform the principal investigator/project director of the reasons for its decision on the proposal.[199]

L. CONGRESSIONAL CRITICISMS OF THE UTILIZATION OF RANN SOCIAL RESEARCH PROJECT RESULTS

The issue of the utilization of RANN project results has received congressional attention. Some recent interchanges between NSF officials and Members of Congress reveal some specific problems and intended NSF uses.

For instance, Senator Proxmire criticized RANN research dealing with the special impact of television on blacks, questioning whether this research does not duplicate research already done. Research Applications Director Dr. Eggers described this report—

> Dr. EGGERS. That is an investigation in three specific areas regarding the impact of TV on blacks: The choice of career, maintenance of physical health and development of black community organizations. This effort was undertaken at the specific request and support of the Office of Telecommunication Policy and the Federal Communications Commission.
>
> The Director of OTP said, I quote:
>
> I feel such a study will be helpful in providing much needed data on black people, and the media to help the minority communities, and communcation policymakers to gain insight in what factors contribute to effective black programing. Specific questions and planned study should provide solid answers as to how the media can better serve the black community.
>
> And the Chairman of the Federal Communications Commission stated, and I quote:
>
> It is my opinion that during the next 10 years, such problems as the ascertainment of the interests and needs of minorities are going to be increasingly important questions for both the individual broadcaster and the Commission. Any information that broadcasters or the Commission can use to develop guidelines that will aid in the translation of programing to meet the needs of communities will certainly be of great value.
>
> Finally, Mr. Chairman, I would like to point out that we appeared before described the effort to them. My clear-cut understanding is that they strongly supported it. In fact, they directed us, by the time we report to them next year, the House Appropriations Committee just last week. We discussed this and to have carried out comparable studies with children, minority children, and otherwise, including of course the impact of violence on television.
>
> Senator PROXMIRE. Has there not been a whole series of studies of the impact of television on people, the effect of various programs on children, the effect of programs involving violence on children and adults and young adults, and the effect of programs that involve sex and so forth on people? Have they really come up with anything that is of great value to our society, or $121,000 worth of value?[200]

In response, the Foundation noted that although other studies have been done on this subject, NSF's study probably is the first to provide "decisionmakers with definitive quantitative information" to assist in policymaking:

> Dr. EGGERS. Certainly in the minds of the decisionmakers at the present time, there is a marked absence of definitive, quantitative information on exactly the

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[199] Ibid., p. 69.

[200] Department of Housing and Urban Development and Certain Independent Agencies Appropriations Fiscal Year 1976, Senate Hearings, op. cit., p. 50.

questions you are raising. I believe this is exactly the reason that we are being urged so strongly to support this work, to provide a much firmer quantitative basis for decisionmaking.[201]

In this particular case several different types of users are expected; however, NSF reports are not intended to dictate policy to the concerned decisionmakers:

Senator **Proxmire.** What do you do with the TV findings? Is it enforceable, the networks? Do we tell the networks that because of the impact television has on blacks, in this case, that they have a different kind of program?

Dr. **Eggers.** No, sir. We would not do that. We do not do that in any of our research. The findings are made available to the decisionmakers. In the instances I pointed out, they would be the TV networks, the decisionmakers in the media itself, the Office of Telecommunications Policy, the Federal Communications Commission; and they would be made available to the Congress, to aid in their deliberation with regard to actions they felt ought to be taken in order to insure that the televisions media was more effectively meeting minority and other needs of the Nation.

Senator **Proxmire.** Of course, television is free. We are told again and again by the FCC that they do not control programming. They do, to some extent. I just wonder how this finding can be made directly useful.[202]

In another interchange with Senator Proxmire about the propriety of NSF, rather than the Law Enforcement (LEAA), support of a study on the effectiveness of a street recording program to reduce crime, NSF noted that the Foundation supported this project because it has a unique and experienced capability in supporting interdisciplinary research. LEAA, the Foundation said, does not now have such a capability; the NSF program, which involves LEAA officials in workshops and conferences, is expected to enhance LEAA's capability to support and use such research:

Dr. **Eggers.** I would like to refer back to your question, if I may, with regard to this particular study, the effectiveness of street recording program on crime reduction stability. I was personally involved in the decision to make that grant, and it was specifically at the request of Martin Danziger, who was head of the National Institute of Law Enforcement.

It is a grant to Oscar Newman, who carried out work on urban security issues prior thereto, and it was felt to be very important, as part of our efforts in supporting their research effort, to fund that particular activity. I have no doubt in my mind as to what official in LEAA, what the official position was, or who the specific official was who wanted us to carry out that research.

Senator **Proxmire.** Crime reduction and community stability, that seems to be so completely an LEAA type of study. They put money into all kinds of things they should not in LEAA, in my view. They are buying all kinds of equipment, including one town in Michigan where they bought a two-way communications system for a police force that consisted of one policeman. They are having trouble finding ways of spending money.

The principal use of the LEAA is doing research that can be done on a national basis to benefit all of our cities. This kind of program would be ideal for them, I would think. A good program. I cannot criticize that it is being done; it should be done. I am just wondering whether they should not be the ones to do it.

Dr. **Eggers.** We find very frequently when we have a tie-in between a principal investigator, the local officials in the city—in this instance, of St. Louis, the principal city that was under investigation—and the local university community, when we have developed over the period of RANN a capability of pulling together this type of team activity, involving the user in exploratory types of research, we believe quite frequently it opens up new opportunities that the mission agency will pick up.

Senator **Proxmire.** Would it not open up a very helpful dialog if we got LEAA involved with the universities? That would greatly improve our law enforcement operations, if we get some of the university thinking and inspiration involved in our law enforcement. The way to do it is have the LEAA, it seems to me, work directly with the university people.

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[201] Idem.
[202] Ibid., pp. 50–51.

Dr. Eggers. We agree, and the reason we hold these workshops is to bring representatives of the user communities. We carry on many workshops. Across the board, the representation at these workshops where the researchers are reporting the results of their work, are 50 percent or more user communities, including the mission agency.[203]

In replying to another critique about a social policy study, NSF emphasized that it is the only agency which supports certain types of interdisciplinary research essential to national and international decisionmaking. The case in point was a study of the societal consequences of weather modification:

Senator Proxmire. I would like to ask you about a study entitled "Study Group on the Societal Consequences of Weather Modification." That is a 3-year RANN project funded under the environmental systems and resources program. It has been in operation for 2 years.

First, would you tell the subcommittee what the project has accomplished?

Dr. Eggers. That is at Southern Methodist University. It is a specific research program taken at the recommendation of the Interagency Committee on Atmospheric Sciences. It has addressed itself over the 3-year period to the multitude of legal implications of weather modification.

As you well appreciate, these are manifold in nature, ranging from considerations that if you increase rainfall in one area, as a result of cloud seeding what alterations may you have caused to rainfall in adjacent areas, downstream areas, and so forth. In the case of any form of weather modification it is known that you cannot assume that effects of that modification apply only in the area where the modification takes place.

Senator Proxmire. That seems logical. But what has this finding done for us?

What use has been made of it?

What is its practical application?

Dr. Eggers. The practical application will be, Mr. Chairman, will be the determination of national and State laws as regarding the application of weather modification, what agreements need to be reached between States where weather modification is taking place.

Senator Proxmire. Have you found any interest among the Members of Congress and State legislators to change the laws on the basis of the study so far?

Dr. Eggers. The study is not complete, Mr. Chairman.

Senator Proxmire. You have 2 years of it.

Dr. Eggers. It is a 3-year study. As you point out, the final results have not come in. It is our impression that the lawyers, the legal authorities in the country that are concerned with the various aspects of changing our environment are tracking the effort very carefully. There is a major publication out already that has been disseminated very widely on the interim results of the research. It is the only major effort of its type going on in the United States today.

By the way, it has more than just a national implication, maybe international implications.[204]

M. GAO ASSESSMENT OF INADEQUACIES OF UTILIZATION PLANNING

The GAO gave considerable attention to reviewing RANN utilization planning. The agency evaluated six research projects which had been funded and renewed under RANN's 1971 interim guidelines for unsolicited proposals and concluded that "there was a general lack of thorough utilization planning for the . . . projects we reviewed . . ."[205]

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[203] Department of Housing and Urban Development, Space, Science, Veterans, and Certain Other Independent Agencies Appropriations for Fiscal Year 1975, Senate Hearing, op. cit., pp. 884–885.

[204] Ibid., pp. 886–887.

[205] Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit., p. 105.

Several inadequacies were identified:

> Users for the initial application to determine concept feasibility were not always identified in the projects' early stages, and user involvement for secondary applications generally did not exist. Also, there appeared to be very little initial planning to identify potential barriers to implementation. In addition, elements of utilization planning were often scattered throughout the proposals, making it difficult to determine the scope of planned utilization activities.[206]

Two unsolicited social science projects were among the six research projects assessed. These dealt with the application of telecommunications to health care delivery in nursing homes and a community development study. These will be described next.

1. *Health care delivery.*—The project evaluating the application of telecommunications to health care delivery in nursing homes studied operation of an "experimental health care delivery system under which nurses, rather than physicians, would make routine and emergency visits to nursing homes and transmit medical data by telecommunications for physician assistance." [207] The project was funded by the Social Systems and Human Resources Division. GAO discovered that several utilization and application questions had not been considered in the proposal. The first was that medical health insurance programs do not reimburse for medical services provided by nurses unless under the direct supervision of a physician. Although the problem was noted, the proposal "failed to identify specific users possibly willing to implement the research results." [208] Proposal review comment indicated that the researchers should have identified potential users better and should have discussed the barriers posed by lack of reimbursement. The researchers subsequently held several conferences on the issue and published results of the study in a journal and the local media. However the GAO concluded that this project demonstrated insufficient attention to considering barriers to utilization and suggested that had these barriers been specified, the project might not have merited funding:

> We believe that utilization planning should consider the views of potential users more extensively. This would assist RANN management in deciding whether to fund the project and in forming user connections for achieving timely and sufficient use of the research to benefit health care delivery. Known potential problem areas should be documented in the proposal to allow peer reviewers to comment on potential problems while considering the worthiness of the proposed research.[209]

2. *Community development.*—The second social sciences project reviewed was a community development study consisting of two related projects assessing the role and contributions to community development of the Mission Coalition Organization, a federation of community organizations in San Francisco's mission development district. The researchers were to study the organization in order to provide decisionmakers with information about interactions between the organization and public agencies. The program was managed first by the Division of Social Systems and Human Resources, and later by the Office of Exploratory Research and Problem Assessment. Five grants totaling $864,000 had been awarded in January 1975 for the study.

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[206] Ibid., pp. 105–106.
[207] Ibid., p. 73.
[208] Ibid., p. 74.
[209] Ibid., p. 74. For a full description of the project, see pp. 146–159.

According to GAO, there were two major inadequacies in the proposal, inadequacies which reviewers had identified, but which were not sufficiently changed by the project managers. First, there was improper utilization planning. The proposal did not detail how the research results would be conveyed to potential users. The second was that many reviewers noted that the organization under study was not typical of community organizations, and therefore findings from the study could not be generalized to other communities and other community organizations. Subsequently reviewers suggested that the research be extended to enable it to be used as a basis for comparing the role of other organizations:

> Suggestions included participation by community organizations from various localities, comparison of findings to situations in other communities, and performance of several additional case studies.[210]
>
> In January 1975, the RANN program manager, noting that the project would be completed in March 1975, said validation would be useful but RANN was not planning any verification efforts in other communities.[211]

Commenting on these problems, GAO recommended "that utilization planning should consider how extensively the research results would apply to other community organizations. Such data would help RANN determine the amount of funds, if any, to invest in a project. In addition, utilization planning should have provided for follow-up to determine the use made of the research. This information would aid RANN in determining the benefits derived from the project and provide information on lessons learned for consideration in funding future projects." [212]

3. Assessment of adherence to new guidelines on dissemination and promotion of research.—In May 1974, the Foundation prepared new guidelines on dissemination and promotion of research which included more stringent provisions for utilization planning proposals and in projects. In summary, the utilization plan was required to (1) identify user groups, actual as well as potential, and the need for user involvement in describing the problem;[213] (2) describe user demand and barriers to full use;[214] (3) describe the utilization process and the steps required to disseminate and use the research results;[215] and (4) identify costs required for conducting utilization activities.[216]

Four projects funded under these guidelines were assessed to evaluate the extent to which the new guidelines were followed. One of the four was an applied social research project. It dealt with the implications of alternative interpretations of the floor and ceiling provisions of the State and Local Fiscal Assistance Act of 1972, a project funded for 1 year at a cost of approximately $85,000. GAO described the project as follows:

> The legislation which provided for allocating revenue sharing funds had at least two interpretations as to how funds should be distributed within a State. Preliminary analysis indicated that significant allocation differences could occur depending on which interpretation was used. The research objective of the

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[210] Ibid., p. 78.
[211] Ibid., p. 78.
[212] Ibid., p. 78. For full details, see pp. 154–158.
[213] Ibid., p. 84.
[214] Idem.
[215] Ibid., p. 85.
[216] Idem.

> project therefore was to analyze the effects of these alternative interpretations and to suggest a final interpretation and possible redrafting of a law.[217]

The GAO found that although the proposal included a utilization plan, many "planned utilization activities were scattered throughout the proposal." [218]

In addition:

> The utilization plan did not identify user demand, barriers to utilization, or the specific steps which would lead to implementation of the research results. Also, utilization planning for this project was not formatted in accordance with the utilization elements suggested in the guidelines. Determining the extent of utilization activity planned for this project requires the reviewer to extract from the proposal those specific statements relating to utilization. This is a very time-consuming process to expect of RANN's peer reviewers.[219]

Generally, the GAO concluded that the four projects prepared under the new utilization plans did not meet the requirements of the guidelines, although planning seemed to be improving. The agency concluded therefore: "To insure adequate emphasis on utilization planning, the information suggested by the guidelines for unsolicited research proposals should be a prerequisite for having a research project funded by RANN." [220]

GAO also found inadequacies in utilization planning for research proposals submitted in response to program solicitations. Utilization planning guidelines have not been established for these proposals. In addition, GAO's review ". . . of 10 solicitations showed inconsistent and sometimes inadequate emphasis on utilization planning. Utilization planning requirements for solicited proposals should be developed." [221]

The General Accounting Office's review also faulted the RANN program for not doing adequate evaluations of project results. GAO appears to have prompted the NSF to prepare a manual for evaluating RANN programs, to help overcome discernible inadequacies.[222] The agency also assessed the library established by the Research Applications Directorate's Office of Intergovernmental Science and Research Utilization. It discovered that only about two-thirds of the reports prepared with RANN funds had been reported and given to NSF, resulting in a large backlog. At GAO's prompting, NSF established revised procedures to overcome these problems:

> The directorate established an interim requirement that all final technical reports and selected progress reports, when believed beneficial to potential users, should be forwarded to the service through the library and that program managers were to require their awardees to prepare abstracts and other information necessary to submit reports to technical information and dissemination systems.[223]

According to GAO, the Foundation generally agreed with its recommendation but expressed concern about the cost effectiveness of more extensive utilization planning, noting that sometimes emphasis on utilization planning should not be given until after a project shows demonstrable results. The Foundation also commented that it is difficult to develop "validated predictors" of utilization performance:

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[217] Ibid., p. 92.
[218] Ibid., p. 93.
[219] Idem.
[220] Ibid., p. 106.
[221] Ibid., p. 106.
[222] Ibid., p. 103.
[223] Ibid., p. 105.

> The Foundation commented, however, that the cost effectiveness of extensive utilization planning at the beginning of a project must be considered and that planning must be judged in terms of overall program design. Some RANN proposals, therefore, may contain heavy utilization activity at one point in time and others little. In this respect, the Foundation believes that much more vigorous utilization planning for program elements, such as environmental systems and resources or social systems and human resources, must be done and that it plans to develop a utilization plan for each program element. The Foundation further commented that it does not have many validated predictors of utilization performance and that RANN is analyzing the utilization performance of 120 projects to establish better predictors.
>
> The Foundation commented that as research progresses utilization activity may change from the initial plan. It cited examples from projects we had reviewed for utilization planning, generally showing that, as research progressed, utilization activity increased beyond what had been provided for in the utilization plan. The Foundation's point was that it may be more cost effective to provide for more intensive utilization activities as the research progresses rather than developing extensive utilization plans at the start of a project. RANN's study of utilization performance for 120 research projects will further consider this point.[224]

In response GAO noted that because some projects present significant utilization barriers, systematic utilization planning should be considered at the beginning of each project:

> Nevertheless, we believe utilization planning should be systematic—not left to chance—and should provide for user involvement. In general, the RANN research projects we reviewed, funded under RANN's interim utilization guidelines, lacked such utilization planning and barriers to implementation apparently were considered as problems arose which, in some cases, was after a project was ongoing for several years. Emphasis on utilization planning seemed to increase, however, with the issuance of RANN's requirement that its utilization guidelines will be mandatory.[225]

X. OTHER POSSIBLE OVERSIGHT ISSUES

Several other issues which may warrant additional attention, but which cannot be fully developed due to the absence of sufficient information are summarized below.

1. The adequacy of staff resources to manage the social research program.—The issue of resources available to manage RANN's social research programs may require future oversight attention. As noted above, during the fiscal year 1975, RANN supported 195 social research projects, classified explicitly as social sciences or other sciences (identified as social sciences by title). This constitutes 25 percent of the total number of RANN projects. Funding for the social research projects totaled $16,159,571, or about 19 percent of total RANN funding. (See table 29.) GAO's report on the RANN program indicated that of the degrees held by key RANN management officials, 17 percent were in social sciences; two-thirds of these were advanced degrees.[226]

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[224] Ibid., pp. 107–108.
[225] Ibid., p. 108.
[226] Extrapolated from data on page 117 of Opportunities for Improved Management of the Research Applied to National Needs (RANN) Program, op. cit.

TABLE 36.—RESEARCH APPLICATIONS DIRECTORATE, SOCIAL SCIENCE AWARDS TO UNIVERSITY PERFORMERS, FISCAL YEAR 1975 DOLLAR FUNDING[1]

	Sociology	Social sciences, NEC	Psychology, social aspects	Anthropology	Economics	Political science	Law	Science policy	Other sciences	Computer sciences
Advanced productivity research and technology	54, 600	504, 422	285, 000		2, 589, 500	397, 750	180, 000	276, 400	299, 120	
Advanced environmental research and technology		114, 100			148, 850				771, 400	
Advanced energy research and technology					435, 890		165, 900			
Office of exploratory research and problem assessment	5, 500	367, 500		279, 800	105, 400		10, 500		125, 000	
Office of systems integration		50, 250			1, 510, 100			37, 500	27, 700	
International travel program									2, 000	
Office of experimental R. & D. incentives									414, 600	
Total (9,158,782)	60, 100	1, 036, 272	285, 000	279, 800	4, 789, 740	397, 750	356, 400	313, 900	1, 639, 820	

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[1] Extrapolated from: U.S. National Science Foundation. Fiscal year 1975 awards by program-subprogram through June 30, 1975 (preliminary yearend report), Research Applications Directorate (Including) Research Applied to National Needs (RANN), Intergovernmental Science, and Research and Development Incentives, 1975. 150 p.

These figures indicate that there seems to be a proper balance between management personnel and the amount of social sciences program support. However, it may be necessary to follow future trends in management of the social sciences to determine if sufficient social sciences management resources will be allocated to the program as it expands to meet the congressional mandate for increasing RANN's support of applied social research.

2. Promotion of academic capabilities to conduct problem-oriented applied social research.—Another issue which may warrant additional attention is the extent and quality of effort RANN is making to support those social science problem-oriented studies which promise greatest yield in terms both of research relevant to national needs and of promoting the development of interdisciplinary social research capabilities in universities.

Two major social science advisory groups, reporting in the late 1960's, counseled that NSF give more support to applied social problem-oriented research. Both of these groups stressed, however, that support should be given to universities or to develop problem-oriented research institutes which would stimulate the growth of interdisciplinary research capabilities among university social scientists.[227] It appears as if none of the NSF programs, including those of RANN, have supported the establishment of such problem-oriented research institutes. However, RANN seems to be making an effort to support university social scientists in the conduct of its problem-oriented applied research programs.

In terms of numbers of awards, 86, or 44 percent of RANN awards for problem-oriented social research went to university researchers during the fiscal year 1975. In terms of dollars, about $9 million, or 60 percent of the RANN award recipients were social scientists. (This should be interpreted as an approximate figure. The document from which it was extrapolated is a preliminary account of the fiscal year 1975 awards of the Research Applications Directorate. It may not include all awards actually given in the fiscal year 1975.[228] Furthermore, NSF reported that on the average only 33 percent of all RANN awards were performed in universities.[229] (See table 36.)

In addition, further attention appears warranted to assessing whether RANN is making an effort to improve the capability of university researchers to conduct interdisciplinary problem-oriented research. The Foundation itself has reported on the strengths and weaknesses of RANN performers. Apparently the university and disciplinary reward structures proscribe the conduct of applied policy-related social research in universities. However, universities seem to excel in developing scientific and technical knowledge bases for policy research. The Foundation has described the problem this way:

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[227] "Knowledge Into Action: Improving the Nation's Use of the Social Sciences." Report of the Special Commission on the Social Sciences of the National Science Board. National Science Foundation. Washington, U.S. Government Printing Office, 1969. pp. xviii–xxi; and "The Behavioral and Social Sciences: Outlook and Needs." A report by the Behavioral and Social Sciences Survey Committee under the auspices of the Committee on Science and Public Policy, National Academy of Sciences, and the Committee on Problems and Policy Social Science Research Council. Washington, National Academy of Sciences, 1969. pp. 239–243.

[228] "Fiscal year 1975 awards. By Program-Subprogram thru June 30, 1975" (preliminary year-end report). Research Applications Directorate. Research Applied to National Needs (RANN), Intergovernmental Science, Research and Development Incentives. Washington, National Science Foundation, 1975. 150 p.

[229] National Science Foundation. "Justification of Estimates of Appropriations. Salaries and Expenses, Special Foreign Currency Program. Fiscal Year 1976 to the Congress." p. F–8. Page F–8 is not included in the complete budget justification. But it is included in a separate publication of the Foundation which includes only the RANN fiscal year 1976 budget.

> Universities have the greatest technical base but have difficulty in organizing it to do timely decision-oriented research. Applied research has second class status on many campuses. Universities are relatively weak on policy research skills, evaluation skills, and benefit-cost skills, all necessary for public policy research. RANN believes that its efforts have increased university capability for public policy research.
>
> The major non-profits have the required policy research skills organized in the proper way but their technical or scientific base is not as great as universities.
>
> Many profit-making firms have the requisite skills for policy research and will deliver timely research. Their technical and scientific base may be limited and have to be augmented through consultant arrangement.[230]

In this connection it may be important to determine what precise efforts RANN is making to inventory the pros and cons of university performers and the extent to which it funds studies which enhance the capacity of university researchers to do problem-oriented research.

3. Coordination of basic social sciences research between RANN and the Directorate of Biological, Behavioral and Social Sciences.—It seems likely that much of the problem-oriented applied social research conducted by RANN performers must draw upon the findings and knowledge generated by the Foundation's Directorate for Biological, Behavioral and Social Sciences, as well as by basic and applied research supported by other agencies. In addition, RANN itself supports basic research. RANN officials reported to the House Committee on Science and Technology during fiscal year 1976 budget hearings:

> RANN will and does fund problem-oriented basic research, i.e., basic research required to solve a problem. For example, improved public service delivery requires better productivity and output measures. To obtain the latter, theoretical and basic empirical research must be carried out. RANN will fund these.[231]

There is no evidence to indicate that the Foundation has established formal communications procedures between RANN officials and staff of the Directorate for Biological, Behavioral and Social Sciences. Such procedures might aid program managers to avoid prematurity and duplication in funding and to identify existing information and knowledge as well as researchers most capable of performing RANN's basic research. Such communications mechanisms might also aid RANN researchers by helping them identify current research which relates to their object of study. It may be useful to inquire if the Foundation is making attempts to cross-fertilize the research supported by the Research Applications Directorate and the Biological, Behavioral, and Social Sciences Directorate.

4. The need for improved reporting on Federal support of interdisciplinary problem-oriented research in the Foundation's series on "Federal Funds for Research, Development and Other Scientific Activities."—Most federally supported interdisciplinary social research and RANN problem-oriented applied social research is reported under the "Social Sciences NEC" (not elsewhere classified) reporting category used in the NSF series. *Federal Funds for Research, Development, and Other Scientific Activities.* As a result, this category, at least for the fiscal year 1976 estimated, included 29 percent of all Federal funds for applied social research and 86 percent of all NSF applied social research funds. No effort is made to differentiate research support by field or scientific discipline. There appears to be a need to develop a more precise reporting and classification system for interdisciplinary problem-oriented applied social research. Improvement in reporting might assist in oversight as well as in providing a basis to evaluate possible duplication between problem-oriented research projects in RANN and in other agencies.

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[230] 1976 National Science Foundation Authorization, House Hearings, op. cit., p. 285.
[231] Ibid., p. 282.

O. RECAPITULATION AND CONCLUDING OBSERVATIONS

The National Science Foundation initiated the Research Applied to National Needs (RANN) program in the fiscal year 1971 to implement the provisions of Public Law 90–407, which gave the Foundation added authority to conduct "applied research relevant to national problems involving the public interest." The program supports problem-oriented interdisciplinary research which meets specific user needs, crosscuts the responsibilities of other agencies, generates comparative findings, or is conducted on behalf of other agencies to avoid bias which might result from an agency's sponsoring policy research related to its mission.

RANN has supported applied social science research since its inception. This program has evidenced a consistent increase in funding, from about $7 million in the fiscal year 1971, to a congressionally mandated minimum of $23 million for the fiscal year 1976. The Congress directed that the NSF give special attention in its fiscal year 1976 social sciences program to applied social research and to policy research to assist in solving urban, municipal, welfare, and general growth and productivity problems.

During the fiscal year 1975, RANN social sciences research support totaled about $16 million or 19 percent of the Research Application Directorate's total funding. The largest share of social sciences funding was for research in economics (30 percent of the total); and for other fields of social sciences, in decreasing order of amount of funding: other sciences, NEC; social sciences, NEC; law; science policy; psychology-social aspects; political science; anthropology; computer sciences; and sociology. The Advanced Productivity Research and Technology Division within RANN supported the largest share of social sciences research, about half of the total for these fields. The remainder was about evenly distributed among the other RANN divisions.

Although on the whole Congress has approved the RANN social problem-oriented research programs, some congressional criticisms and a recent General Accounting Office report have identified several inadequacies in the management of these support activities.

Congressional criticisms include the following: some projects duplicate or overlap the responsibilities of other agencies; some research is irrelevant to "national needs"; and the results of some studies cannot be generalized, for instance, from one community to another.

The recent GAO study identified several management problems which may contribute to these shortcomings. The study demonstrated that most of the priorities for specific social science studies are determined by NSF officials or by the trend of unsolicited proposals. GAO recommended that management would be improved, potential duplication would be avoided and utilization would be enhanced if RANN program management systematically attempted to obtain a wider range of opinions about priorities for research. Specifically, the agency noted that while NSF has established an interagency coordinating committee for RANN as well as a subsidiary committee for social sciences, the committees have not played significant roles and have not met as frequently as necessary. The agency also suggested that the determination of priorities for research would be improved if RANN management made more effort to solicit the views of potential users in problem identification and program formulation. One of RANN's social research programs—on revenue sharing—was used to illustrate these issues. It was also noted that RANN has not constituted disciplinary advisory groups for social sciences projects, and that it might be useful to consider convening such groups to provide RANN with additional advice about reputable researchers and important research trends. NSF has reported that it might not always be cost-effective to widen priority determination mechanisms.

The General Accounting Office also suggested that proposal review procedures seem to warrant improvement. The data and analysis provided by GAO suggested that program managers who select reviewers should be more objective in selection and should include a wider spectrum of individuals, especially more potential users in proposal review. The GAO's study also demonstrated the need for researchers to be given more information about why awards might have been declined.

Congressional criticisms of RANN have also faulted utilization activities. NSF indicated that studies which might seem to duplicate the activities of other agencies are supported for a variety of reasons, including the need to compile a quantitative basis of policy information for decisionmaking, to support interdisciplinary research which other agencies may not be capable of managing, to train other agency personnel in problem-oriented research management, and to conduct impartial studies whose outcome might be biased if the study were to be conducted by a mission agency directly responsible for administering a program.

GAO's assessment of RANN utilization indicated several shortcomings, which do not seem to have improved even though RANN has modified its utilization plans. Based upon its research, GAO recommended that RANN make systematic attempts to identify potential users and barriers to utilization while a research program is being formulated. The GAO also recommended that RANN conduct better evaluations of project results. NSF noted that it might not always be cost-effective to identify all users and barriers to utilization in the program planning stage, since many users and barriers to utilization can be identified only as the research progresses.

The General Accounting Office also found deficiencies in RANN's utilization library. Only two-thirds of the reports prepared with RANN funding had been transmitted to the agency library, therefore curtailing dissemination.

Tabulations of data supplied by NSF on fiscal year 1975 awards indicated that social sciences support constitutes about 18 percent of the RANN budget. About half of this support is managed by the Productivity Section, and about 60 percent of all social research awards went to university performers. It was noted that RANN seems to have sufficient social sciences staff capability to manage these awards, but that it may be useful to follow management in the future to determine if social sciences staff capability will be augmented to coincide with the congressional request that RANN increase the amount of applied social research and policy research.

The inception of RANN applied social research programs coincided with recommendations from notable social science advisory groups that NSF give more support to problem-oriented social research. However, no NSF program, including RANN, supports the creation of problem-oriented social research institutes recommended in these reports.

RANN staff have indicated that university performers are not the best performers of much interdisciplinary policy research. In view of the apparent need to enhance the capability of university researchers to do problem-oriented policy research, it was noted that it may be useful to obtain information about whether RANN is making efforts to improve academic capabilities to do policy research.

There is no evidence to indicate that NSF has established mechanisms to support systematic communication between program managers in RANN and in the Directorate of Biological, Behavioral and Social Sciences. It may be necessary to investigate this topic since RANN says it funds basic research and because problem-oriented and policy research rest on accumulations of basic and applied social and behavioral science knowledge.

The topic of the inadequacy of NSF mechanisms for reporting funds obligated for interdisciplinary applied social research was also addressed. The general reporting category "social sciences NEC" is used to report about 29 percent of all Federal applied social research and 86 percent of NSF applied social research. Further attention might be given to determining whether this reporting system should be improved, so that interdisciplinary projects can be better identified in an effort to enhance oversight and to evaluate possible duplication between Federal agencies which support the conduct of policy-oriented applied social research.

V. FINAL OBSERVATIONS

It seems evident that the psychological and social science disciplines and Federal programs and policies for their support have reached a critical juncture. Policymakers are increasingly calling upon social scientists to provide information and answers to solve major public policy problems. However at the same time, some policymakers are questioning the priorities, procedures for accountability, management, and utility of Federal support programs. Social scientists themselves are also assessing Federal support priorities and are conducting research to enhance the utility of their work. Several important studies of these issues are underway.

The National Science Foundation supports only about 10 percent of federally funded social science and behavioral research. However, the Foundation is a major supporter of academic social science research and the principal supporter for basic research in several disciplines. Thus it plays an important role as a Federal support agency.

The topic of creating a separate National Foundation for the Social Sciences has surfaced once again in congressional debates. For instance, in 1975, Foundation officials said that although they believe the social sciences have an appropriate home in the NSF, they would not oppose creation of a separate National Foundation for the Social Sciences if consensus were reached to create such an agency. NSF officials also indicate that they would lend the benefit of their experiences to such a body.[232]

Consideration of any policy for these sciences requires better information and understanding, not only about the scope, objectives, and accomplishments of the NSF programs, but also about the scope, objectives and accomplishments of other agency programs. An assessment of similarities and differences between these support programs, an evaluation of the need for multiple sources of funding for similar studies, better information and analysis about the relationships among basic, applied, and problem-oriented social research, and of the obstacles to utilization seem to be required to maintain the Congress' role in helping develop the Nation's capabilities in these disciplines. Continued examination of these issues, coupled with forceful review by the groups now examining them undoubtedly would provide a better information base from which to develop appropriate policies for improving the health of these major fields of science.

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[232] See the comments of the Honorable James W. Symington in: 1976 National Science Foundation Authorization. House hearings, op. cit., pp. 155, 277–278, 313.

APPENDIX I

A. What Are the Social Sciences?[223]

"The social sciences are intellectual disciplines that study man as a social being by means of the scientific method. It is their focus on man as a member of society, and on the groups and societies that he forms, that distinguishes the social sciences from the physical and biological sciences.

Historically, five social sciences have been regarded as central; anthropology, economics, political science, psychology, and sociology. Other important fields that deal with social phenomena are: demography, history, human geography, linquistics, and social studies. (Branches of psychology and anthropology often fall in the biological sciences as well as the social sciences. Similarly, parts of historical inquiry properly belong in the humanities. We refer the reader to the forthcoming report of the Behavioral and Social Sciences Survey Committee for an exposition of the nature of these disciplines, their development, and the kind of work that each does. We also leave to that report the tasks (1) of describing the hybrid fields that exist within the social sciences, and between the social sciences and the natural sciences; and (2) of distinguishing between behavioral sciences and social sciences.)

Anthropology and sociology are somewhat difficult to distinguish from each other. Both study the societies in which man lives, that is, the social forms and structures within which individual and group behavior takes place. *Anthropology* (which includes social anthropology, archaeology, physical anthropology, and the linguistics of preliterate cultures) studies the varied physical and cultural characteristics of man throughout the world. Traditionally, its attention has been directed to primitive cultures. But a number of anthropologists now study the cultures of industrialized societies, including of course the United States; and anthropologists have produced fruitful work on such important contemporary problems as poverty, ghetto life, minority groups, and mental health.

Sociology is often called the science of society. In contrast to anthropology, sociology has always concentrated on the structure and functioning of groups within literate societies. Sociologists study such features of society as the family, rural and urban life, race relations, crime, and occupational groupings. (Social psychology is an important subfield that sociology shares with psychology. Social psychology studies the behavior of man as influenced by the groups to which he belongs.)

Economics is the study of the allocation of scarce productive resources among competing uses. Within this framework, economists engage in theoretical and empirical research on macroeconomic subjects—reaching and maintaining full employment, avoiding inflation and deflation, understanding and promoting economic growth, analyzing fiscal and monetary policies, defining balance and imbalance in international payments; also on microeconomic subjects—market pricing, monopolies, manpower, labor markets, union movements, farm issues, and problems resulting from inequalities in income distribution and poverty.

Psychology studies the nature and organization of mental processes in man. Psychologists deal with man's mental abilities and aptitudes, his capacities for learning, for thinking, for emotional expression, and for motivation. Psychologists have developed intelligence and aptitude tests for a great variety of uses. They work on problems of learning in education, problems of personnel selection in industry, and problems of clinical assessment in mental illness, among many others.

Political Science investigates the ways in which men govern themselves. It is concerned with the goals of the political system, the structural relationships in that system, the patterns of individual and group behavior which help explain how that system functions, and the policy outputs as well as behavioral consequences of that system. Political scientists study a variety of phenomena involved in the process of government, including political parties, interest groups, public opinion and communication, bureaucracy, international relations, and administration.

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[223] U.S. National Science Foundation. Knowledge Into Action: Improving the Nation's Use of the Social Sciences. Report of the Special Commission on the Social Sciences of the National Science Board. Washington, National Science Foundation, 1969: 7–10.

These, then, are the five central social science disciplines. We turn now to short descriptions of the fields that are closely related to the social sciences.

Demography is the science of population. It studies the composition and movement of human populations—births, deaths life expectancy, and migration. Demographers work on large-scale manpower problems to estimate and predict the numbers of persons in given categories of interest—for example, the number of voters in the states to determine how many members each state will have in the House of Representatives, and the number of men likely to be available for military service at some future date.

History has two well-known aims: to reconstruct events of the past from records and artifacts made near the time of the events, and to analyze why events occurred as they did. Historians contribute a valuable perspective to analysis of current activities by providing a sense of continuity over time; and their analysis of persons, movements, events, and concepts in the past is extremely helpful in much other social science research.

Human Geography has two intertwined foci: the relationships between man and his natural and manmade environments, and the patterns and processes of spatial organization. It has associated increasingly with other sciences, and shares many social science concerns and methods of inquiry. Geographers study such problems as the spread of new ideas between places; the perception and control of environmental hazards such as floods and drought; and the general spatial organization of metropolitan areas including such items as land value patterns, planning of human and environmental systems, and intraurban migrations.

Linguistics elicits language data to produce insights into the structure of language and the meaning of specific language units. It investigates the basic characteristics of many languages—their sound systems, grammatical categories, and rules of syntax. In this study of particular languages, linguistics seeks to understand language in general. Anthropologists and linguists share an interest in the unwritten language of primitive peoples: and the language of a people tells the anthropologist a great deal about the culture and its origins. The language of an individual speaker reveals information about social status, geographic origin, and personality that are of interest to the psychologist and sociologist. Psycholinguists study how children learn to use language.

The theory of *statistics* has broad applicability in all the sciences; but specific techniques have been developed for the specific research needs of the social sciences. Multiple correlation and regression have been developed to substitute for controlled laboratory experimentation. Sampling procedures; factor analysis; handling of nonnormally distributed observations; testing of hypotheses and estimation of parameters from nonexperimental data; decision theory and nonparametric testing—these are methodological developments particularly important to social science.

The brief descriptions above separate the social sciences on the basis of their substantive concerns. Equally important are their common methods of inquiry. They all live by the "scientific method," that is, they seek publicly verifiable, and hence formulative, knowledge. Speculation about the nature of social phenomena is never sufficient by itself; empirical tests of speculative propositions are an integral part of these disciplines, as is the estimation of the numerical frequency of cited instances.

Experimentation, central to the scientific method as practiced in the physical and biological sciences, is relatively absent from the social sciences. Only in psychology has a substantial amount of experimentation been carried out. Two reasons for this omission have been the lack until recently of experimental techniques, and the great costs involved in such experiments. There is also the strong moral proscription against experimenting with human beings, which absolutely prohibits some kinds of experiments. Social scientists are often able to approximate experiments, however, and can attain some of the analytic virtues of experimentation through the sophisticated use of statistical controls.

Social scientists try to be as objectively independent as possible of their own biases. Obviously, no scientist in the social area can be completely detached from his environment, but social scientists make their methods public so that others may attempt to repeat their work and, thus, appraise their findings.

Our description of the social sciences characterizes them as academic disciplines. Academic social scientists are primarily interested in pursuing basic research problems within their respective disciplnes. They often pay relatively little attention to practical applications of their disciplines, though their interest in this area is increasing. Many do consult on applied problems for organizations outside universities. There are also a number of recognized applied specialists—industrial relations, city planning, economic forecasting, criminology, and educational psychology, among others. But even where these constitute formal fields of study, they tend to be given secondary status in the prestige structure of the university.

Much (and varied) applied work is, however, going on outside the colleges and universities—in government, business, and independent research institutes—which is problem-centered and not discipline-centered. This makes it difficult to classify such research by discipline. A social scientist often works on a problem that has traditionally "belonged" to a discipline other than the one in which he was trained. And one finds non-social scientists (mathematicians, engineers, and computer experts) increasingly working on problems that social scientists have traditionally regarded as their own."

B. ILLUSTRATIONS OF RECENT ACCOMPLISHMENTS OF THE NATIONAL SCIENCE FOUNDATION'S BASIC AND APPLIED PSYCHOLOGICAL AND SOCIAL SCIENCES SCIENTIFIC RESEARCH PROJECTS SUPPORT PROGRAMS, TAKEN FROM MATERIALS PROVIDED BY THE FOUNDATION

It is sometimes difficult to identify precise accomplishments of NSF's basic and applied psychological and social sciences support programs. Problems are posed by time-lags between the conduct of basic and applied research and publication, researcher's inadequate reporting of results to NSF and Foundation policies which sometimes tend to discourage public discussion of research results until published in technical journals. However, the information that is available demonstrates significant achievements that have resulted from the basic and applied research support programs. A few illustrations, taken from NSF publications, will be given next to add some perspective to these programs.

1. Special Instrumentation.—The Division's special instrumentation program is supporting research and development of an environmental simulation laboratory. It is impossible to manipulate physically all environmental variables which must be accounted for in making public policy decisions. The simulation lab permits architects, planners, and psychologists to manipulate, in theory, alternative future physical environments relevant to policymaking. It also serves as a basic tool in programs of environmental psychology, designed to evaluate how attitudes and behaviors change with changes in the physical environment.[234]

2. Survey Research.—Improvements in the methodology and use of survey research, a fundamental and essential data gathering tool in social sciences, have received extensive support from the special projects research support program. NSF supported research has looked at problems of invasion of privacy, improvements in methodology, and abuses of survey research in an effort to increase the reliability of this technique and its products. As one example of synthesizing research in this area, NSF reports:

"A series of NSF-supported conferences was held under the sponsorship of the American Statistical Association which brought together social scientists and survey methodologists in universities, major Federal agencies, and in the private sector. [Among the issues treated were the following:] What problems do exist and how are they currently affecting the survey activities of academic research groups, of government agencies, of reputable commercial organizations? What actions can be taken to improve the legitimacy of survey research in a way that will be recognized by the profession and be meaningful to the public? What statistical innovations are possible that would lower economic and social costs without sacrificing accuracy or quality of results? The decisions and recommendations [of the conference] were published in a report that received wide attention. Further pursuit of this very important matter is planned both through implementation of conference recommendations amenable to research and through the support of ancillary projects which deal with the challenges and problems facing the survey method." [235]

3. Law and Social Sciences.—The Division's program in Law and Social Sciences is designed to improve the use of social science information in the judicial process. A related objective is to better understand the sequence of steps in legal decisionmaking. NSF explains some of this research as follows:

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[234] National Science Foundation. Justification of Estimates of Appropriates, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, p. B–XI–17.

[235] Ibid., p. B–XI–14.

"Among the research topics being investigated are the communicative behavior of law students and law professors; an attempt to develop tests for measuring lawyers' skills: . . . a study of the characteristics of lawyers involved in public interest law . . . the uses of social sciences in judicial decisionmaking, variability in the use of pre-trial discovery procedures, language patterns of trial lawyers and the process of settling complains outside normal legal institutions." [236]

4. *Anthropology.*—NSF has supported anthropological research at Teotihuacan Mexico for about the last twenty years. According to the Foundation the findings of this research describe how the ancient city emerged and how its social systems were formed. Researchers are now beginning to answer questions about why the city died. Although these findings are significant for their own intrinsic merit, they also help modern man better understand the problems of urban development. The researcher, NSF reports "believes that we, as a society, have a need to know what Teotihuacan is in a unique position to teach us. It was an urban society, the story of whose beginning, middle, and end are all there waiting to be understood. Our own urban society also has a beginning and a middle—and perhaps as many ends as our understanding permits us to contemplate." [237]

5. *Research on International Decisionmaking.*—The Foundation's support programs in social psychology and political science seem to have generated results which enhance understanding of decisionmaking in high threat conflict situations. Especially important in this respect are the breakthroughs generated by NSF support of research to understand the dynamics of resolving non-zero sum games, which characterize much of the conflict between the world's major superpowers. NSF explains some of its research support and implications as follows:

"In their study of "Deterrence in America Foreign Policy," Alexander L. George and Richard Smoke, both NSF grantees at Stanford University, point out that 'following the Cuban missile crisis, Kennedy and Khrushchev moved quickly to a detente. What was significant in this development was that American leaders began to view the Soviet Union as a limited adversary rather than as a total enemy.

'Similarly, the nature of the conflict with the Soviet Union was now perceived in non-zero sum terms rather than, as in the acute cold war era, in terms of a zero-sum contest.'

Deutsch might put it that the conflict was changing from a total win-lose situation into one with broadened alternatives in which both could benefit.

'This change,' George and Smoke continue, 'was dramatically signalled in President Kennedy's eloquent American University address of June 10, 1963, when he called on the American people to reexamine their views on the cold war and warned his listeners 'not to see only a distorted and desperate view of the other side, not to see conflicts as inevitable, accommodation as impossible, and communication as nothing more than an exchange of threats. No government or social system is so evil that its people must be considered lacking in virtue.'

After broadening the range of alternatives, the two nations were able to narrow specific bits of their conflict into issues that were susceptible to resolution.

'The two antagonists in effect agreed not to push and thus exacerbate their long-standing disagreements over Central and Eastern Europe, arms control inspection, Cuba, overseas U.S. bases, etc.,' say George and Smoke.

'Whereas the cold war had been dominated by a belief in the necessary indivisibility of issues, with everything somehow connected with everything else, the limited detente ushered in a willingness to reach agreement on many single issues that could be separated from other, more important matters on which agreement would have been more difficult.'

'A number of such agreements were quickly made—the partial test ban, the 'hot-line' agreement, cooperation on peaceful uses and exploration of space, etc. Other agreements, such as the nuclear non-proliferation treaty, followed more slowly.' " [238]

6. *Political Participation.*—The Political Science research program also has supported a series of cross-national studies which assessed different types and

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[236] Ibid., p. B XI-13.
[237] A Pre-Columbian Metropolis, Mosaic, v. 6, No. 5, Sept.-Oct. 1975: p. 33.
[238] There Doesn't Have to be a Loser, Mosaic, v. 6, No. 5, Sept.-Oct. 1975: p. 25.

rates of political participation in a number of countries. This information indicates that political parties and traditional interest groups are the major and most effective sources of information and advice used by political decisionmakers. However, many interests are not represented in political decisionmaking because participation in political parties and interest groups usually is limited to affluent elites. NSF supported research ". . . offers, perhaps the largest single body of quantitative evidence not only that the well-off predominate among political activities here and abroad, but that their activity does influence disproportionately the choices made by political leaders. It further suggests that the traditional insitutions of political mobilization in the United States, such as political parties and voluntary organizations, tend to limit the participatory opportunities of the less affluent, more so even than in some other, ostensibly less representative societies."[239]

Further research demonstrates that new emerging groups, who may be less affluent, would do well to try to channel their demands through traditional methods, rather than using other communications techniques such as street demonstrations and letter writing campaigns. In greater detail, the Foundation reports:

"For [Sidney] Verba, [one of the NSF grantees conducting this research], the implications of the cross-national research on participation is twofold: First, 'those who participate seem to obtain more of the benefits' and second, the messages sent to political leaders from those who participate 'do not necessarily represent the distribution of preferences of their constituents.'

Because participation is voluntary in a democracy, not much can be done by governments to increase activity by the non-participants. But for those frustrated with the system, Verba says the research results demonstrate the 'staying power' of traditional forms of participation compared to demonstrations and other nontraditional forms. Those engaging in the latter would be advised to couple it with traditional participatory acts."[240]

7. *Evaluation Research.*—NSF's support of social science research methodology has generated significant advances in program evaluation research techniques, especially experimental evaluation research, which decisionmakers seem to be advocating as a preferred research tool. NSF notes the importance and use of one of its grantee's research on this topic:

"An example of a distinctive NSF contribution in the area of evaluation of Federal programs is Professor Donald Campbell's work at Northwestern University. Professor Campbell has been supported by the Division of Social Sciences in his program of research on measurement and experimentation in social settings. When the Office of Economic Opportunity contracted to have its Head Start programs evaluated, Dr. Campbell obtained access to the basic data and demonstrated that defects in the design of the evaluation techniques rendered the findings invalid. He is continuing under NSF support his effort at improving the methods by which social programs can be evaluated. This is of fundamental importance because the new techniques can be applied to a wide range of social interventions. Campbell's research exemplifies the kind of work that is given high priority by the Division of Social Sciences."[241]

8. *Economic Data Bases.*—Numerous criticisms have been raised about inaccuracies in economic data series and the lack of correspondence between the data collected and the activities being measured. NSF explains these problems as follows:

"To the general public, the flood of economic statistics from government agencies, research organizations, and industry gives the impression of a field that is well—if not over-documented. But the volume of economic statistics obscures the fact plaguing economists that much of the data on which they rely is outdated, so poorly formatted as to be irrevelant from the standpoint of analysis of new trends and questions, and mutually incompatible and inconsistent. Domestic output data for many goods, for instance, cannot be compared with corresponding export and import figures. And even when detailed output/input tables on the U.S. economy are released, the latest figures they cover currently lag six to eight years behind, and summary data lag by two and a half to three years.

As another example, consumer disposable income tabulations (a prime indicator used to make forecasts of consumer spending), treat payments to a public university as public fees to be deducted from disposable income whereas payments to a private university are not. Thus, families sending children to private universities are shown in most computations as having more disposable income than those sending children to public institutions. And when GNP, a household word of economic forecasting, goes up, the economists cheer, even though they know that an increase in automobile accidents resulting from disregard of speed limits further inflates the GNP by stimulating auto repairs, new car sales, etc."

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[239] Some are More Equal, Mosaic, v. 6, No. 5, Sept.-Oct. 1975:11.
[240] Ibid., p. 14.
[241] 1976 National Science Foundation. Authorization. House Hearings, op. cit., p. 152.

The result of such anomalies is that economists spend "an unreasonably high proportion of material and intellectual resources" struggling with 'incongruous definitions and irreconcilable classifications,' according to economist and Nobel prize winner Wassily Leontief.[242]

NSF's support to the Brookings Institution, the National Bureau of Economic Research and other institutions and researchers is designed to correct shortcomings in these data bases and to generate better understanding of the theories of economics. In addition, the Foundation has supported conferences to bring together economists and decisionmakers to discuss important economics issues. For instance:

Another recent development designed to present economists' thinking on live issues confronting the policymakers in an objective forum is the Brookings Panel on Economic Activity, supported in part by the National Science Foundation. The panel brings economists of differing viewpoints together on current issues and the view of all are reflected in summary papers, and in comments on published research papers, currently edited by Okun and Perry.[243]

9. Social Indicators.—NSF has probably supported more fundamental work in social indicators than any other Federal agency. Some support comes from the Economics program which awards funds for improving national economic accounting, including factors such as non-market activities, improved measurement of intermediate goods and services, and the impact and accounting of environmental factors.[244]

However, the bulk of the Foundation's support comes from the Social Indicators Support program. NSF has explained some of its initial support and major institutional support programs:

"Between 1964 and 1970, development of a sizable fraction of what are now regarded as the prototype social indicator approaches was supported by NSF. In 1970, NSF expanded its role and today probably operates the only sustained research program in the field. Its efforts are directed strictly toward research, and not toward production of indicators. One of its first major efforts was to establish the Center for the Coordination of Research on Social Indicators, in Washington, D.C., under the sponsorship of the Social Indicators Research Council. The Center's activities involve three general areas:

> Building networks among individuals and institutions working or interested in the field through its library, newsletter, and participation in meetings and conferences.
>
> Bringing suitable analytical strategies to bear on the development of social indicators. For example, the SSRC Center for Social Indicators convened and published the results of a symposium to review Social Indicators 1973 and has discussed with the Federal Office of Management and Budget plans for the new edition scheduled for 1976.
>
> Improving the accessibility and availability of the data base for measurement of social change. For example, in order to make survey procedures more comparable, the Center is preparing standard ways of asking standard questions (age, occupation, education, etc.), and of coding the responses." [245]

The Foundation's work has also involved preparation of an index of "all the questions that have been asked more than once in the 4,000 national surveys housed in the [Roper Public Opinion Research Center] Archives." With the index, "Survey Data for Trend Analysis", NSF reports, "researchers can more easily exploit the historical potential of the Roper Data Center." [246]

NSF social indicators support has also promoted the synthesis of various disaggregated sets of data produced by Federal agencies. For instance, the

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[242] The New Delphians, Mosaic, v 6, no. 5, Sept.–Oct. 1755: 17–18.

[243] Ibid., p. 20.

[244] A National Science Foundation, Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit., p. B–XI–11.

[245] Quantifying the Unquantifiable, Mosaic, v. 6, no. 5, Sept.-Oct. 1975: 5–6.

[246] Ibid., p. 5.

Foundation reports the following about a grant to the National Bureau of Economic Research:

"The present national accounting framework cannot easily accommodate information which is not expressed in terms of monetary transactions or information which is highly disaggregated, as for example information relating to distributions by household, by social group, by region, or by demographic characteristics. . . . In the absence of any direct source of data for appropriate economic, social, and demographic information on households, researchers at the [National] Bureau [of Economic Research, Inc.] invented a method for synthesizing a set of household "microdata" (information on work-leisure time ratio, education, health, age, sex, etc., per individual aggregated to the level of household by region.) The method involves the matching and linking of data from a variety of public or "model" files maintained by such agencies as the Census Bureau, the Social Security Administration, and the IRS.

This microdata set has been used to estimate, for one particular year, how much pollution each household was responsible for generating in terms of that household's productive activity and its consumptive use of polluting devices such as automobiles, heating and air conditioning.

[In combination with other data sets the information was used] to contrast air pollution estimates with estimates of the cost of reducing pollution, by type of pollutant. The "social indicator" in this example is the seriousness of air pollution in various localities or among different social groups." [247]

The Foundation is also supporting social indicators research which replicates studies done previously, and which were used by the Office of Management and Budget in preparing its first social report: "Social Indicators 1973." It is expected that the data generated under the succeeding Foundation grants will be used in the forthcoming OMB report on "Social Indicators 1976." [248]

NSF explains one of its replication studies as follows:

"The potential of some earlier surveys is already being exploited in the General Social Surveys being conducted by James A. Davis of the National Opinion Research Center of the University of Chicago. The surveys, which started in 1972 and will be repeated annually until at least 1976, are asking questions that appeared in previous national surveys taken between 1945 and 1972 by the National Opinion Research Center, the Gallup Poll, and the University of Michigan's Institute for Social Research. Results of the surveys are being made available on punched cards and at nominal cost in order to encourage analysis of the trends described.

While money is generally accepted as the measure of economic transactions, there is no similar currency for social transactions. How people spend their time is proving a valuable measure, however, since time encompasses all behavior and is equally available to all members of society.

The first comprehensive national study of American's use of time was conducted in 1965 and 1966 by Philip E. Converse and John P. Robinson of the University of Michigan's Institute for Social Research. The original study was funded by NSF, and now the Foundation is helping replicate it in 1975. Not only will the replication permit comparisons of time use patterns over the last ten years, but it is taking advantage as well of recent methodological developments and will produce information of a much more sophisticated and detailed sort." [249]

C. Illustrations of Recent Accomplishments of the National Science Foundation's Problem-Oriented Social Science Research Support Programs in the RANN Section, Taken From Materials Provided by the Foundation

Several notable achievements in social research supported by the Research Applications Directorate will be described next.

1. Public Opinion Survey on the Energy Crisis.—A survey conducted by the National Opinion Research Center during the height of the energy crisis in 1973–1974 was supported by the RANN Energy Program. Researchers obtained information about public reactions to the energy crisis to assist decisionmakers and particular Federal agencies which needed the information to develop policies for energy conservation and price control. The survey also looked at possible changes in behavior patterns resulting from the crisis. The results demonstrated that people would curtail the use of recreational vehicles but would continue using private vehicles to drive to work.[250]

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[247] National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit. B–XI–5.

[248] Ibid., p. B–XI–11.

[249] Quantifying the Unquantifiable, op. cit., pp. 6–7.

2. *Assistance in Establishing State Science Policy Bodies.*—The Intergovernmental Science Program has assisted several State bodies both executive and legislative in establishing science and technology, environmental quality, and energy advisory mechanisms. In addition a project carried out in Tacoma, Washington, but having implications for other cities, studied whether "fire departmental costs might be converted from support by the property tax to a charge paid by all users, including tax-exempt institutions." [251]

3. *The Implications of Behavior Modification Technology.*—The Program of Exploratory Research and Problem Assessment has supported a considerable amount of innovative interdisciplinary social research. For example, one award led to the publication of a book on ethical, social, and legal issues involved in the application of behavior control technology. The work was performed by the Institute of Society, Ethics, and Life Sciences, Hastings on Hudson, New York. According to NSF, the publication contains a series of guidelines on psychosurgery, which are being used by several Presidential commissions looking at the issue of biomedical experimentation.[252]

4. *Assessment of Social Innovations.*—Other selected achievements of the Exploratory Research and Problem Assessment Program include an examination of the "economic and social consequences associated with various alternative work schedules such as shorter work weeks and 'flex-time,'" assessed by Haldi Associates in New York.[253] In addition, "the Arthur D. Little Company has completed a comprehensive technology assessment of the potential impacts of widespread application of electronic funds transfer. . . . The report . . . will be available to the newly established National Commission on Electronic Funds Transfer." [254]

5. *Evaluation Research on Municipal Operations and Human Resources Delivery.*—RANN's support of a series of evaluations on policy research would seem to promise significant assistance to Federal agencies which fund such delivery programs and research studies. Ten awards were intended to provide a body of synthesized information about the state of the art of evaluation research in the two areas.

Generally, researchers looked at "the quality, validity, and generalization of the work," and identified findings most relevant for Federal, State, and local decisionmakers. Seventeen topics were covered in municipal operations, and 19 in the field of human resources. Before the studies were disseminated RANN attempted to validate the findings by asking researchers and potential users to review the work. RANN also provided funding to disseminate the reports. The following is a list of the 39 awards, showing the research area evaluated, the organization to which the award was made, and the principal investigator:

(1) Fire Protection—Georgia Institute of Technology, Department of Industrialization Systems Engineering, Atlanta, Georgia, 30332; D. E. Fyffe.

(2) Fire Protection—New York Rand Institute, 545 Madison Avenue, New York, New York, 10022; Arthur J. Swersey.

(3) Emergency Medical Service—University of Tennessee, Bureau of Pupil Administration, Knoxville, Tennessee, 37916: Hyram Plaas.

(4) Municipal Housing Services—Cogen Holt and Associates, 956 Chapel Street, New Haven, Connecticut, 16510: Harry Wexler.

(5) Formalized Pre-Trial Diversion Programs in Municipal and Metropolitan Courts—American Bar Association, 1705 DeSales Street, N.W., Washington, D.C., 20036: Roberta-Rovener-Pieczenik.

(6) Parks and Recreation—National Recreation and Park Association, 1601 North Kent Street, Arlington, Virginia, 22209; The Urban Institute, 2100 M Street, N.W., Washington, D.C. 20037: Peter J. Verhoven.

(7) Police Protection—Mathematica, Inc., 4905 Del Ray Avenue, Bethesda, Maryland, 20014: Saul L. Gass.

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[250] National Science Foundation, Annual Report, Fiscal Year 1974, op. cit., pp. 73–77.

[251] Ibid., p. 80.

[252] Ibid., p. 82.

[253] National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit., p. F–IV–2.

[254] National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit., p. F–IV–2.

(8) Solid Waste Management—Massachusetts Institute of Technology, Department of Engineering, Cambridge, Massachusetts, 02139: David Marks.

(9) Citizen Participation Strategies—The Rand Corporation, 2100 M Street, N.W., Washington, D.C., 20037: Robert Yin.

(10) Citizen Participation: Municipal Sub-systems, The University of Michigan Program in Health Planning, Ann Arbor, Michigan 18101: Joseph L. Fallsen.

(11) Economic Development—Ernst & Ernst, 1225 Connecticut Avenue, N.W., Washington, D.C. 20036: Lawrence H. Revzan.

(12) Goal of Economic Development—University of Texas-Austin Center for Economic Development, Department of Economics, Austin, Texas 78712: Niles M. Hansen.

(13) Franchising and Regulation—University of South Dakota, Department of Economics, Vermillion, South Dakota 57069: C. A. Kent.

(14) Municipal Information Systems—University of California, Public Policy Research Organization, Irvine, California 92664: Kenneth L. Kraemer.

(15) Municipal Growth Guidance Systems—University of Minnesota, School of Public Affairs, Minneapolis, Minnesota 55455: Michael E. Gleeson.

(17) Land Use Controls—The Potomac Inst., Inc., 1501 Eighteenth Street, N.W., Washington, D.C. 20036: Herbert M. Franklin.

(18) Municipal Management Methods and Budgetary Processes—The Urban Institute, 2100 M Street, N.W., Washington, D.C. 20037: Wayne A. Kimmel.

(19) Personnel Systems—Georgetown University, Public Services Laboratory, Washington, D.C. 20037: Selma Mushkin.

(20) An Evaluation of Policy Related Research on New Expanded Roles of Health Workers—Yale University, School of Medicine, New Haven, Connecticut: Eva Cohen.

(21) An Evaluation of Policy Related Research on the Effectiveness of Alternative Allocation of Health Care Manpower—Interstudy, 123 East Grant Street, Minneapolis, Minnesota 55403: Aaron Lewin.

(22) An Evaluation of Policy Related Research on Effects of Health Care Regulation—Policy Center, Inc., Suite 500, 789 Sherman, Denver, Colorado 80203: Patrick Donoghue.

(23) An Evaluation of Policy Related Research on Trade-Offs Between Preventive and Primary Health Care—Boston University Medical Center, Boston University School of Medicine, Boston, Massachusetts 02215: Paul Gertman.

(24) An Evaluation of Policy Related Research on Effectiveness of Alternative Programs for the Handicapped—Rutgers University, 165 College Avenue, New Brunswick, New Jersey 08901: Monroe Berkowitz.

(25) An Evaluation of Policy Related Research on Effects of Alternative Health Care Reimbursement Systems—University of Southern California, Department of Economics, Los Angeles, California 90007: Donald E. Yett.

(26) An Evaluation of Policy Related Research on Alternative Public and Private Programs for Mid-Life Redirection of Careers—Rand Corporation, 1700 Main Street, Santa Monica, California 90406.

(27) An Evaluation of Policy Related Research on Relations Between Industrial Organization, Job Satisfaction, and Productivity—Brandeis University Florence G. Heller Graduate School for Advanced Studies in Social Welfare, Waltham, Massachusetts 02154: Michael J. Brower.

(28) An Evaluation of Policy Related Research on Relations Between Industrial Organization, Job Satisfaction and Productivity—New York University, Department of Psychology, New York, New York 10003: Raymond A. Katzell.

(29) An Evaluation of Policy Related Research on Productivity, Industrial Organization and Job Satisfaction—Case Western Reserve University, School of Management, Cleveland, Ohio 44106: Suresh Srivastva.

(30) An Evaluation of Policy Related Research on Effectiveness of Alternative Methods to Reduce Occupational Illness and Accidents—Westinghouse Behavioral Safety Center, Box 948, American City Building, Columbia, Maryland 21044: C. Michael Pfeifer.

(31) An Evaluation of Policy Related Research on the Impact of Unionization on Public Institutions—Contract Research Corporation, 25 Flanders Road, Belmont, Massachusetts: Ralph Jones.

(32) An Evaluation of Policy Related Research on Projection of Manpower Requirements—Ohio State University, Center for Human Resource Research, Columbus, Ohio, 43210: S. C. Kelley.

(33) An Evaluation of Policy Related Research on Effectiveness of Alternative Pre-Trial Intervention Programs—ABT Associates, Inc., 55 Wheeler Street, Cambridge, Massachusetts, 02138: Joan Mullen.

(34) An Evaluation of Policy Related Research on Standards of Effectiveness for Pre-Trial Release Programs—National Center for State Courts, 725 Madison Place, N.W., Washington, D.C., 20005: Barry Mahoney.

(35) An Evaluation of Policy Related Research on Effectiveness of Volunteer Programs in the Area of Courts and Corrections—University of Illinois, Department of Political Science, Chicago Circle, Box 4348, Chicago, Illinois, 60680: Thomas J. Cook.

(36) An Evaluation of Policy Related Research on Effectiveness of Juvenile Delinquency Prevention Program—George Peabody College for Teachers, Department of Psychology, Nashville, Tennessee, 37203: Michael C. Dixon.

(37) An Evaluation of Policy Related Research on Exercise of Discretion by Law Enforcement Officials—College of William and Mary, Metropolitan Building, 147 Granby Street, Norfolk, Virginia, 23510: W. Anthony Fitch.

(38) An Evaluation of Policy Related Research on Exercise of Police Discretion—Nation Council on Crime and Delinquency Research Center, 609 2nd Street, Davis, California, 95616: M. G. Neithercutt.

(39) An Evaluation of Policy Related Research on Post Secondary Education for the Disadvantaged—Mercy College of Detroit, Department of Sociology, Detroit, Michigan, 48219: Mary Janet Mulka.[255]

6. Other Research in Productivity.—The Productivity section has made several other notable awards. For instance, according to NSF:

"Gerald Miller, Professor of Communications at Michigan State University, received a joint reduction of tribute from the Michigan legislature for his RANN-supported work in the use of videotape technology in courtroom trial situations. The resolution states, 'This creative and imaginative undertaking has the potential of ultimately producing revolutionary data relative to courtroom procedures.' The results of Professor Miller's experiments have been reported in a number of law school conferences, the most recent one in San Francisco, sponsored by Michigan State and Hastings School of Law of the University of California and McGeorge Law School of the University of the Pacific." [256]

The Productivity Section's work on Municipal Systems resulted in research which demonstrated that local governments could save money by accounting for the time value of money calculating interest rates for municipal bonds.[257] Also under an award from this program, the Urban Institute developed procedures to assist local governments in tracking the productivity of programs over time. According to NSF, the research findings have been used in other cities:

"A number of new measures were developed, including citizen surveys, service user surveys, and trained observer measurement of libraries, street cleaning, and landfilled operations. The measurement techniques have been tested and applied in St. Petersburg and Nashville in programs on rat control, street cleaning, and recreation. The productivity measurement work has been successfully disseminated to other cities including Randolph, New Jersey; Falls Church, Virginia; Palo Alto, Calif.; Memphis, Tennessee, and Birmingham, Alabama." [258]

The section's work on legalized gambling would seem to have far-reaching implications for States which now have lottery systems and which permit off-track betting, as well as for States contemplating adoption of these types of activities. The research demonstrated that such types of gambling do not demonstrably affect "personal, familial or work situations of the average bettor." [259] However, at the same time, such activities are not "significant sources of government revenue in relation to total revenues." [260]

Urban systems awards, with findings generally applicable to other cities indicated efficient and effective procedures for the treatment of accident victims, of sanitation services, and the spatial configuration of buildings to deter crime.[261]

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[255] 1976 National Science Foundation Authorization. House Hearings, op. cit., pp. 249–252.

[256] National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit., p. F–III–2.

[257] National Science Foundation. Annual Report, 1974, op. cit., p. 77.

[258] National Science Foundation. Justification of Estimates of Appropriations, Salaries and Expenses, Special Foreign Currency Program, Fiscal Year 1976 to the Congress, op. cit., p. F–III–3.

[259] National Science Foundation. Annual Report, Fiscal Year 1974, op. cit., p. 77.

[260] Idem.

[261] Idem.

7. *Research on Revenue Sharing.*—RANN's support of research on general revenue sharing represents one of its major attempts to couple research on major national policy issues to both national and local decisionmakers. RANN explains this program as follows:

"NSF has developed in cooperation with several other agencies, including the Congress, a research effort to examine the impact of the program of general revenue sharing. As you know, some $30 billion would be distributed over the 5-year lifetime of that program, and new legislation to extend the program is imminent. It is important that decisionmakers in the Congress, in the executive branch, and in State and local governments have access to a well-analyzed and validated body of evidence as they consider possible legislative changes. Such matters as the impact of possible alternate formulas, the actual distribution of expenditures, and the views of local officials, community leaders, and citizens are being analyzed. This research effort was designed to focus the necessary research rapidly on the most significant questions to provide answers for the decision process and was developed with close involvement of the Office of Revenue Sharing, the OMB, committee staff of the Congress, the Advisory Commission on Intergovernmental Relations, a number of prominent scientists, and the several public interest groups that serve the cities and States. It provides a fine example of an effort where many groups and organizations need the results but none has the resources or expertise to put together an objective, current, and comprehensive evaluation of a major Federal program. It provides a good example of the RANN approach to public policy research. It also illustrates that NSF can act quickly." [262]

According to NSF, most of this research was completed by June 1975, in time for congressional debates on revising the general revenue sharing program. Part of the reports were reprinted in a congressional committee print.[263] NSF's announcement about the availability of reports and forthcoming studies in the series is given next:

NATIONAL SCIENCE FOUNDATION,
Washington, D.C., August 18, 1975.

PUBLICATION ANNOUNCEMENT

Several reports on research projects supported by the National Science Foundation (NSF) on aspects of the Federal General Revenue Sharing Program are now available. The General Revenue Sharing Program, begun under the State and Local Fiscal Assistance Act of 1972, provides for the distribution by the Federal Government of $30.2 billion to 39,000 general-purpose State and local governments over a five-year period that ends December, 1976. Discussions over the renewal and possible future form of the General Revenue Sharing Program have begun in Congress.

The reports, which explore various aspects of the allocation formula for distributing general revenue sharing funds, are listed below together with brief descriptions of subject matter. A limited number of copies are available from the listed principal investigators and from NSF. After August 31, 1975, reports should be purchased directly from the National Technical Information Service (NTIS), Springfield, Virginia, 22161, using the NSF-Research Applied to National Needs (RANN) document numbers given below. The order should be marked Attention: Document Sales. A volume containing summaries of the allocation formula studies described below will be available after August 31, 1975, from The Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Stock number: 038-000-00231-7; $2.40 per copy.

ALLOCATION FORMULA STUDIES

"The Impact of Alternative Interpretations of the Floor and Ceiling Provisions of the State and Local Fiscal Assistance Act of 1972," (Part I); "Programs to Implement Alternatives," (Part II). Dr. Robert P. Strauss is the Principal Investigator. Copies of the report are available only from Dr. Trudi

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[262] U.S. Congress. Senate. Committee on Appropriations. Department of Housing and Urban Development, and Certain Independent Agencies Appropriations, Fiscal Year 1976. Hearings on H.R. 8070. 94th Congress, 1st session. Washington, U.S. Government Printing Office, 1975. p. 5.

[263] Interview.

Lucas, RANN, Room 1128, National Science Foundation, Washington, D.C., 20550. (202) 634-6260; or from NTIS: (NSF-RA-S-75-017, Part I); (NSF-RA-S-75-017A, Part II). Part I studies four possible interpretations of the floor and ceiling provisions for allocations to governments under the Act. Part II is a program for making allocations.

"Brookings Studies of Revenue Sharing Formula Alternatives." Mr. Allen Manvel, The Brookings Institution, 1775 Massachusetts Avenue, N.W., Washington, D.C. 20036. (202) 797-6067. (NSF-RA-S-75-020). Due to Mr. Manvel's illness, this first report from Brookings was prepared by Dr. Richard Nathan and Mr. Jacob Jaffe. The effects of the existing state option to drop either relative income or relative tax effort from the allocation formula within the state is explored.

"Alternative Formulae for General Revenue Sharing: Population Based Measures of Need." Dr. John P. Ross, Virginia Polytechnic Institute, Blacksburg, 24061. (703) 951-5517. (NSF-RA-S-75-019). Seeks to identify population groups with needs for expanded public services and to redesign the formula to provide more money to the governments that serve them.

"State Responsibility for Public Services and General Revenue Sharing." Dr. Ross Stephens, Department of Political Science, University of Missouri-Kansas City, 64110. (816) 276-1326. (NSF-RA-S-75-015). Proposes alternative formulae which challenge the fixed State/local split in order to better reflect State responsibilities for financing and delivering services.

"An Alternative Approach to General Revenue Sharing: A Need Based Allocation Formula." Gregory Schmid, Institute for the Future, 2740 Sand Hill Road, Manlo Park, California 94025. (415) 864-6322. (NSF-RA-S-75-013). Develops an evaluation index to judge governments' needs for financing services and reshapes the formula to provide more funds to needy governments with high relative tax effort.

"Equalization and Equity and General Revenue Sharing: An Analysis of Alternative Distribution Formulas. Part I: Alternative Interstate Distribution Formulas." Dr. Stephen M. Barre, Rand Corporation, 2100 M Street, N.W., Washington, D.C. 20037. (202) 296-5000. (NSF-RA-S-75-023). This preliminary report offers formula designs to produce more fiscal equalization and greater distributional equity among States than the existing formula.

"Alternative Formulae for General Revenue Sharing: Stability of Allocations." (Part I), Dr. Morton Lustig, University of Pennsylvania, Philadelphia, 19174. (215) 243-8211. (NSF-RA-S-75-018). A redesigned formula to smooth fluctuations in revenue sharing payments from one entitlement period to the next.

"General Revenue Sharing: Designing a Formula Which Does Not Discourage or Distort Local Variations and Financing and Delivering Services." Mr. Barry Jesmer, Center for Governmental Research, Inc., 37 South Washington Street, Rochester, New York, 14608. (716) 325-6360. (NSF-RA-S-75-016). Analyzes the "neutrality" of the existing formula to identify and eliminate features which encourage recipient governments to make changes in taxes and in structures to obtain more revenue sharing funds.

"General Revenue Sharing Formulae Alternatives: Governmental Functions and Needs." Mr. Reese C. Wilson, Stanford Research Institute, 333 Ravenswood Avenue, Menlo Park, California, 94025. (415) 326-6200, ext. 3376. Examines a large number of changes in the data and mechanics of the formula in order to better allocate funds according to the needs, responsibilities and functions of governments.

FORTHCOMING REPORTS

In addition to supporting research on the formula for general revenue sharing, RANN has supported studies on the impacts and processes of the program. Topics include recipient uses of funds for tax relief, capital projects and operating programs; citizen participation in local funding decisions; evaluations of the program by government officials, community groups and citizens; compliance with civil rights requirements; and implications of inflation for various funding levels. Announcements of the availability of these reports will be made shortly.

BACKGROUND INFORMATION

A bibliography and background material on the revenue sharing program are available from the National Planning Association. Contact Ms. Martharose Laffey, National Planning Association, 1666 Connecticut Avenue, N.W., Washington, D.C., 20009. (202) 483-2260.

Data tapes combining Census of Governments, Census of Population and Housing, and Office of Revenue Sharing allocation information are available from Data Use and Access Laboratories. Contact Mr. Robert Gignilliat, DUALabs, Suite 900, 1601 North Kent Street, Rosslyn, Virginia, 22209. (703) 525–1480.

Data tapes and documents describing the process used by the Office of Revenue Sharing to make allocations are available from Westat, Inc. Contact Mr. Thomas Jones, Westat, Inc., 11600 Nobel Street, Rockville, Maryland 20852. (301) 881–5310, ext. 269.

For information about individual projects and results, contact principal investigators. For information about NSF's RANN revenue sharing research program, contact Dr. Trudi Lucas, (202) 634–6260.

D. SOCIAL AND BEHAVIORAL SCIENCE PROGRAMS IN THE NATIONAL SCIENCE FOUNDATION: PRINCIPAL FINDINGS AND RECOMMENDATIONS OF THE COMMITTEE ON THE SOCIAL SCIENCES IN THE NATIONAL SCIENCE FOUNDATION [264]

PRINCIPAL FINDINGS AND RECOMMENDATIONS

"The body of this report examines the National Science Foundation's programs of support for basic and applied research and their administration. This section provides a map for that examination by setting forth very briefly the most important findings and recommendations.

Support of basic research

1. The quality of basic research projects in the social and behavioral sciences supported by the Foundation is generally excellent, although some reservations about specific emphases are detailed later in this report. There is also a large number of excellent proposals that are rejected because they cannot be supported within the present program budgets.

2. Projects that require large-scale support (several hundred thousand dollars per year or more) or that need to be supported over a long period to produce results tend to be discouraged, rejected, or reduced.

3. Many important investigations of high quality are now underfunded or completely unfunded. Since only about 30 percent of the qualified investigators in the social and behavioral sciences receive federal research funds, the pool of available research talent is adequate for substantial expansion of activity. (An average of 58 percent of investigators in the other sciences receive federal funds.)

4. Evaluating the relative adequacy of NSF funding of basic research among the several social and behavioral science disciplines is not easy, especially if support from other federal agencies is to be taken into account. Data on the proportion of proposals funded, the amount of research support per university scientist, and recent trends in total federal and Foundation support do not present an entirely consistent picture. On balance, however, researchers in psychology, political science, and anthropology may be faced with especially severe funding problems. The proposed fiscal 1977 budget, if adopted, would go some distance toward alleviating the stringency of funds in psychology, but would not significantly improve the situation in political science and anthropology.

5. No important areas of basic social or behavioral science research were identified that could not seek support under one or another of the existing programs. We commend strongly the proposed creation of the new programs for sensory physiology and perception and for memory and cognitive processes, separating these topics from the previously very heterogeneous psychobiology program. In the report's discussion of the individual programs, a number of specific questions of direction and balance are raised that require attention from program directors and advisory panels, but that probably do not call for formal reorganization of the program structure.

6. The report identifies a number of important research opportunities that have been insufficiently explored or exploited by the Foundation, generally because of the large scale of support or the long-term commitment they imply.

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[264] Committee on the Social Sciences in the National Science Foundation, Assembly of Behavioral and Social Sciences, National Research Council. Social and Behavioral Science Programs in the National Science Foundation. Final Report. Washington, D.C., National Academy of Sciences, 1976. pp. 5–8.

These kinds of opportunities will continue to be neglected unless the staff of the Directorate for Biological, Behavioral, and Social Sciences encourages large-scale proposals when they are justified by the circumstances, reviews them carefully even when they cannot be funded within current budgets, and takes an active and vigorous role in seeking additional allocations of Foundation funds to support those that are meritorious. Some examples of such research opportunities are: longitudinal studies over extended time periods, comparative research across nations and cultures, and national research facilities for, for example, survey research, information processing psychology, psychoacoustics, large data bases, and advanced study.

7. Research involving laboratory experimentation or using advanced mathematical and other quantitative techniques appears to receive relatively high priority in most of the social sciences. While this is an appropriate emphasis in the Foundation setting, greater support needs to be provided (particularly in social psychology, economics, sociology, and political science) for studies using techniques of field research and ethnographic analysis of social institutions and processes. Special encouragement should be offered to substantive studies that show good promise of advancing these latter methodologies and making them more reliable and informative.

8. Not all basic research programs now employ outside panels for the review of proposals. Panels should be created for all programs now lacking them and should be used regularly by all programs. Average panel ratings of proposals should be determined, and panels should be informed whether projects are funded. The program directors should provide explanations whenever they do not follow the recommendations of the review panels.

9. There should be more input from the scientific community in program planing. Ad hoc advisory groups should be used by program directors in planning future programs and budgets. Each advisory group should meet with the appropriate program director at least once a year.

10. It does not appear that the staff managing basic research in the social and behavioral sciences has effectively represented these sciences at the higher administrative levels of the Foundation and in the Foundation's negotiations with the administration and Congress. It is imperative that they perform these functions better.

Support of applied research

11. The Committee attaches great importance to the support of applied research aimed at solving significant problems in our society. The RANN (Research Applied to National Needs) program is a useful component of the federal government's support of applied behavioral and social science research, complementing and filling gaps in the programs of the mission agencies. However, the present RANN program needs strengthening. The RANN social and behavioral science research is highly variable in quality and, on the average, not impressive. Moreover, the scale of the program is quite modest in relation to the range of appropriate research targets.

12. The RANN procedures for developing programs and proposal solicitations and for reviewing proposals do not provide adequately for the participation of applied scientists. Present procedures may be reasonably suitable for assessing the relevance of proposals to social goals, but more participation of the performer communities is essential for judging the scientific quality of proposed projects. Proposals should be funded only if they meet high standards of both relevance and scientific quality.

13. Achievement of the RANN applied research objectives is impeded by some aspects of the present RANN operation. In particular, RANN procedures now reflect excessive confidence in the ability of a few staff members to determine the proper direction for research programs. Staff pressure to tailor research proposals to narrowly specified programs, planned from the top down, plays too large a role in RANN funding decisions, and response to genuinely unsolicited proposals plays too small a role.

14. The roster of the behavioral and social science programs within RANN should be modified to correspond more closely to the structure of the applied fields that will carry out the research. Many of the present research activities could be better accommodated in programs for such interdisciplinary fields as public finance, organizational administration, operations research and management science, communications, public choice, urban affairs, human performance, land use and resource management, government regulation of industry, public law, program evaluation and measurement, or combinations of these fields.

15. Improving the quality of the research projects funded by RANN and their outputs requires greater stability of programs and longer-range financing of projects.

16. The Directorate for Research Applications needs greater participation by staff with training in the social and behavioral sciences. The need is particularly acute in those programs that fund technical research with important economic and social implications and in the higher administrative levels of the Directorate."

APPENDIX II

1. Letter to Hon. Ray Thornton from Dr. Sanderson, National Science Foundation, July 15, 1977
2. Memo to Hon. Ray Thornton from Ms. Knezo, Congressional Research Service, August 30, 1977

National Science Foundation,
Washington, D.C., July 15, 1977.

Hon. Ray Thornton,
Chairman, Subcommittee on Science, Research, and Technology, Committee on Science and Technology, House of Representatives, Washington, D.C.

Dear Mr. Chairman: I am pleased to submit the Foundation's comments on *The Psychological and Social Sciences Research Support Programs of the National Science Foundation: A Background Report*, prepared for your Subcommittee by Ms. Genevieve J. Knezo, of the Library of Congress.

The report provides a reasonably accurate summary of the history of the Foundation's support of research in psychology and the social sciences. However, the report contains a number of assumptions and conclusions which do not reflect accurately the Foundation's support of psychological and social science research. Moreover, the report also gives a somewhat misleading picture of the impact of the Foundation's program of Research Applied to National Needs on NSF support of social science research.

A major theme of the report is that NSF basic and applied research support for psychology and the social sciences has consistently declined as a percentage of the total NSF budget since 1971. Further, the report states that "the onset of this pattern of relative decline is associated with the inception of the research applied to national needs (RANN) program."

It appears that the report's statements on the specific percentage of declining NSF support for research in psychology and the social sciences are based on the exclusion of all RANN social science research support from both basic and applied research. These funds are reclassified under a new category entitled "Problem Oriented Research". This exclusion makes it impossible to discern trends accurately. While the Foundation recognizes that the separate tabulation of funds allocated to "Problem Oriented Research" has merit for some purposes, this special classification would need to be applied to all years and all programs in order to arrive at a clear picture of trends in funding.

The decline in the percentage of NSF research support allocated to psychology and the social sciences does not imply a decline in the dollar amounts so allocated. The Foundation's support of basic and applied research in psychology and the social sciences was $27.3 million in fiscal year 1970 compared to an estimated $53.6 million in fiscal year 1976. In a rising budget, the percentage of total support may decrease while the actual level of support increases. Moreover, a complete analysis would have to compare growth rates for other scientific disciplines and other agency support on a comparable basis.

The report also misinterprets certain NSF records. Consequently parts of the report fail to reflect the strong commitment to peer review that characterizes NSF programs. The report interprets "amendments" to grants as implying staff review only. Renewal applications, which are given full review by non-NSF scientists, constitute a substantial proportion of actions classified as "amendments". Contrary to the impression created by the report, reviews by specialists outside the Foundation play a major part in all Foundation actions except relatively minor budget modifications or time extensions. While Foundations policy does not require outside review for each year of a continuing grant, the outside reviewers of the original proposal evaluate such projects specifically for long term support. A new proposal and full peer review is required at the end of the overall period (three to five years). Foundation policy is based on the assumption that it is in the interest of both the scientific community and the Foundation to provide longterm commitments of support to especially meritorious projects.

The report assumes that the absence of an Advisory Panel review means that there is no peer review. But this is not the case. In fact, on the relatively few non-panel actions there is usually heavier use of outside reviewers and site visits. The Foundation has established some additional Advisory Panels since the report was drafted. But some of the fields listed in the report as examples of programs without panels are not programs. For example, "research in modelling" is not a separate program. Proposals falling in this area are not handled as a special class but are referred to the appropriate program for review. Ordinarily, an Advisory Panel for the relevant discipline as well as by other non-panel specialists will examine these.

The Foundation is also concerned about unsubstantiated statements in the report such as: "There is some information to indicate that top recipients may not be the 'best' research performers." The National Academy of Sciences/National Research Council report on Social and Behavioral Sciences Programs in the NSF (Simon Committee Report) came to quite a different conclusion. The Knezo report has not made explicit any information that would run counter to the intensive exploration of NSF actions on which the Simon Committee Report was based. The present report, like those preceding it and from which it draws, does not present any firm basis for assuming that scientifically irrelevant criteria have intruded into the Foundation's funding decisions. We believe that scientific merit, as judged by a broadly based set of peer reviewers, provides the best assurance that the most meritorious research will be supported.

The Foundation has provided continuing strong support for basic and applied research in the social sciences and plans to continue to do so in the future.

Sincerely yours,

JACK T. SANDERSON,
Director, Office of Planning and Resources Management.

AUGUST 30, 1977.

To: Honorable Ray Thornton.
From: Genevieve J. Knezo, Analyst in Science and Technology, Science Policy Research Division.
VIA: James M. McCullough, Acting Chief, Science Policy Research Division.
Subject: Response to NSF comments on the study, *The Psychological and Social Sciences Research Support Programs of the National Science Foundation.*

Thank you for this opportunity to respond to the comments in the letter of July 15, 1977, from Dr. Jack Sanderson, National Science Foundation, concerning the study I drafted for your Subcommittee entitled *The Psychological and Social Sciences Research Support Programs of the National Science Foundation.* I met several times since January 1977 with members of Dr. Sanderson's staff to discuss their disagreements and suggested changes. I appreciate the Foundation's comments but, for the most part, our position remains the same.

This report was completed in August 1976 and an executive summary was published in your Subcommittee's hearings on the NSF fiscal year 1977 authorization bill. At that time data were available only through the fiscal year 1976. Subcommittee staff agreed with me that it was neither necessary nor proper to update the report for publication since the summary of it has already been published. Nor do we believe the decision not to update the report vitiates the findings since they are based on data and observations extending back at least a decade.

We contend that it was necessary to differentiate between basic, applied, and problem oriented social and psychological research. Legislative enactments have put spending floors on RANN applied social research for the last few years, making such research a special congressional concern. Also, RANN research differs from basic and applied research due to its interdisciplinary nature and procurement practices used to fund it.

Our sources for information on funding trends and analyses were data obtained from the NSF series, *Federal Funds for Research, Development and Other Scientific Activities*, and information supplied by NSF staff. Longitudinal trends as embodied in tables 5, 6, 11, and elsewhere, indicate that basic and applied social and psychological research funding declined over the period 1971 (inception of RANN) to 1976 and that funding for many discipline research areas supported by the Division of Social Sciences declined over the period. If there are inaccuracies, we believe they are in the data sources. A footnote on page three noted the beginning of a reversal in funding trends for some areas which has occurred in 1977 and 1978, after our study was completed.

We do not agree that data describing continuing and amended awards or advisory panels were misinterpreted. In order to help NSF maintain its high standards, it appears that improved reporting to the Congress on administration of continuing awards and more public advice in the form of advisory panels for determining priorities for new lines of support would be useful.

Finally, our discussion of the quality of research performed by some "top" recipients has been fully documented in the text. There seems to be no reason to withhold from the Congress information of this nature even though it may contravene the findings of the Simon committee, whose findings are summarized in the report.

The reasons for the differences between our report and the Foundation's comments are explained above. We hope this information is useful to you. We look forward to continued cooperation with your Subcommittee and the National Science Foundation on future oversight of the NSF social and psychological sciences programs.

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